

Source: ETSI TC-RES

Reference: DTR/RES-06008

ICS: 33.060.20

**Key words:** TETRA, V + D, open channel

**Radio Equipment and Systems (RES);  
Trans-European Trunked Radio system (TETRA);  
Voice plus Data (V + D)  
Open channel**

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## Foreword

This ETSI Technical Report (ETR) has been prepared by the Radio Equipment and Systems (RES) Technical Committee of the European Telecommunications Standards Institute (ETSI).

Annex A contains informative text relating to the description and scenarios related to a group voice call.

The normative text related to the supplementary service stage 1 of Access Priority (AP) is provided in annex B for advanced information. This annex is designated to be in draft ETS 300 392-10 [3].

The normative text related to the supplementary service stage 1 of Priority Call (PC) is provided in annex C for advanced information. This annex is designated to be in draft ETS 300 392-10 [3].

The normative text related to the supplementary service stage 1 of Pre-emptive Priority Call (PPC) is provided in annex D for advanced information. This annex is designated to be in draft ETS 300 392-10 [3].

The normative text related to the supplementary service stage 1 of Call Retention (CR) is provided in annex E for advanced information. This annex is designated to be in draft ETS 300 392-10 [3].

The normative text related to the supplementary service stage 1 of Call Authorised by Dispatcher (CAD) is provided in annex F for advanced information. This annex is designated to be in draft ETS 300 392-10 [3].

The normative text related to the supplementary service stage 1 of Late Entry (LE) is provided in annex G for advanced information. This annex is designated to be in draft ETS 300 392-10 [3].

The normative text related to the supplementary service stage 1 of Dynamic Group Number Assignment (DGNA) is provided in annex H for advanced information. This annex is designated to be in draft ETS 300 392-10 [3].

The normative text related to the supplementary service stage 1 of Transfer of Control (TC) is provided in annex J for advanced information. This annex is designated to be in draft ETS 300 392-10 [3].

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## 1 Scope

This ETSI Technical Report (ETR) describes what is meant by open channel operation in the case of the Trans-European Trunked Radio system (TETRA), what are the users' perception of this particular mode of operation and, which are the technical solutions offered to support it.

## 2 References

This ETR incorporates by dated and undated reference, provisions from other publications. These references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETR only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ETR 086-1 (1994): "Trans-European Trunked Radio (TETRA) - Technical requirements specification - Part 1: Voice plus Data (V+D) systems"
- [2] Draft prETS 300 392-1: "Trans-European Trunked Radio (TETRA) - Voice plus Data standard; Part 1: General network design".
- [3] Draft prETS 300 392-10: "Trans-European Trunked Radio (TETRA) - Voice plus Data standard; Part 10: Supplementary services stage 1".

## 3 Definitions and abbreviations

### 3.1 Definitions

For the purpose of this ETR, the following definitions apply:

**Base Radio Stack (BRS):** A logical grouping that includes all of the air interface protocol element in one Base Station (the fixed side of the air interface).

**Base Station (BS):** A physical grouping of equipment which provides the fixed portion of the air interface. One base station transmits and receives radio signals to and from a single location area (a single region of geographical coverage). A BS contains at least one Base Radio Stack (BRS).

**bearer service:** A type of telecommunication service that provides the capability for the transmission of signals between user-network interfaces.

**call:** A complete information exchange between two or more parties. See also call transaction.

**call re-establishment:** The action of switching a call in progress from one cell to another or between radio channels in the same cell.

NOTE 1: Call re-establishment is used to allow established calls to continue when mobile stations move from one cell to another cell, or as a method to escape from co-channel interference.

**call set-up:** A call set-up consists of all the signalling messages exchanged before user information may be sent on the allocated resource. It generally includes the first transaction set-up phase, but not always.

**call transaction:** All of the events associated with one continuous transmission of information during a call (including control signalling). A call consists of one or more call transactions.

NOTE 2: In a half-duplex call, the call consists of a sequence of unidirectional transactions.

**cell:** The smallest geographical area where TETRA services may be obtained, using a certain set of radio frequencies.

NOTE 3: Each adjacent cell (touching or overlapping) must use a different set of radio frequencies to avoid co-channel interference.

**downlink:** An unidirectional radio pathway for the transmission of signals from one Base Station (BS) to one or more Mobile Stations (MS).

**duplex (full duplex):** A mode of operation by which information can be transferred in both directions and where the two directions are independent. See also half duplex.

**facility:** The means to assist the performance of an action.

**half duplex (semi duplex):** A mode of operation by which information can be transferred in both directions but in which the transfers are mutually dependent (i.e. uplink and downlink transfers share some resources). See also duplex.

**Location Area (LA):** An area within a TETRA network that may comprise one, several or all cells. A MS may move freely without re-registering within a Location Area. A MS has continuity of service within a Location Area. A Location Area is geographically static.

**message trunking:** A method of traffic channel organisation where each traffic channel is permanently allocated for the complete duration of the call, which may include several separate call transactions (several pressel activations by separate terminals). The channel is only de-allocated if the call is (explicitly) released or if a timeout expires. See also transmission trunking, quasi-transmission trunking.

**Mobile Radio Stack (MRS):** A logical grouping that includes all of the air interface protocol element in one Mobile Station (the mobile side of the air interface).

**Mobile Station (MS):** A physical grouping that contains all of the mobile equipment that is used to obtain TETRA services. By definition, a Mobile Station contains at least one Mobile Radio Stack (MRS).

**network:** A collection of subscriber terminals interconnected through telecommunications devices.

**open channel:** A traffic resource that is permanently allocated to those users authorised to access it for the duration of availability of the service (static allocation). See also pseudo open channel.

**open channel operation:** Refers to the procedures undertaken in either open channel or pseudo open channel.

**pseudo open channel:** A traffic resource which is dynamically allocated to those authorised users for the duration of at least a transaction (dynamic allocation). See also open channel.

**quasi-transmission trunking:** A method of traffic channel organisation where each traffic channel is allocated for the each call transaction (while the pressel is activated) and in addition the channel de-allocation is delayed for a short period at the end of the transaction (after the pressel release). During this 'channel hold-time', the channel allocation may be re-used for a new call transaction that is part of the same call. A delayed channel de-allocation procedure will apply at the end of each transaction.

**supplementary service:** Modifies or supplements a bearer service or a teleservice. A supplementary service cannot be offered to a customer as a stand alone service.

**teleservice:** A type of telecommunications service that provides the complete capability, including terminal equipment functions, for communication between users according to agreed protocols.

**transaction set-up:** Consists of all the signalling messages exchanged before user information may be sent again on the allocated resource.

**transmission trunking:** A method of traffic channel organisation where each traffic channel is individually allocated for each call transaction (for each activation of the pressel). The channel is immediately de-allocated at the end of the call transaction (subject to unavoidable protocol delays). See also message trunking, quasi-transmission trunking.

**uplink:** A unidirectional radio communication pathway for the transmission of signals from one or more Mobile Stations (MS) to one Base Station (BS).

### 3.2 Abbreviations

For the purpose of this ETR, the following abbreviations apply:

BS	Base Station
ECCH	Extended Control Channel
GSSI	Group Short Subscriber Identity
ID	(call) IDentifier
MCCH	Main Control Channel
MS	Mobile Station

## 4 Applicability of services

Open channel operation is in principle applicable to the following services defined in ETR 086-1 [1]:

- speech teleservice point to multipoint, either normal or encrypted;
- point to multipoint bearer services.

Nevertheless, individual calls (point-to-point services) may operate as in an open channel call, but the individual call should be considered as a group call with only two participants. This will enable the same set of rules to apply to any open channel operation regardless of the number of participants.

## 5 Realisation of service

Open channel operation may be realised in two ways:

- there is the static allocation, where the open channel is a traffic resource that is permanently allocated for the duration of the service; or
- there is the dynamic allocation, where the open channel is a traffic resource that is allocated on demand for the duration of availability of the service.

This latter realisation offers to the users the impression that they have their own personal channel all the time that they need it, even in a loaded system, but shares the resource with other users when unused by the open channel members.

The realisation of open channel operation should use the concepts of Priority Call (PC), see annex C and Call Retention (CR), see annex E, to maintain the open channel. Access Priority (AP) combined with the high call priority of open channel operation or even pre-emptive priority, should be used to ensure a transaction set-up fast enough to be useful, even in a loaded system. It is assumed that, if required, other calls may be pre-empted in order that the traffic resource can be re-allocated to the open channel.

NOTE: Multisite operation is allowed as in normal group calls.

In dynamic allocation, the "pseudo" qualifier is used to denote that the channel may be shared with other users when not being used by the group or individuals who have access to the service.

Nevertheless, the system also permits operation as per classical open channel whereby the channel is not shared with other parties.

The call characteristics of open channel are those of a message trunked call with no end (or quasi-transmission trunked with infinite hang time). Pseudo open channel, in order to support the dynamic nature of the service, has the call characteristics of quasi-transmission or transmission trunking.

The time after which the mobile stations will have to free the resource after a transaction is under the control of the infrastructure. The channel to which they will be directed, i.e. either the Main Control Channel (MCCH), (or any common control channel) for pseudo open channel operation, or the same channel in the open channel case, is also under the control of the infrastructure.

Open channel operation will be identified by a call ID unique during its life. The call owner/authorized users are the only ones, apart from the infrastructure, who are able to clear the open channel operation, as is the case for group calls.

A pseudo open channel may be set up by the combination of several supplementary services, e.g. Access Priority (AP), see annex B, Priority Call (PC), see annex C, Pre-emptive Priority Call (PPC), see annex D, Call Retention (CR), see annex E, without the infrastructure being informed in advance of the call set-up messages that will be used to establish the open channel operation. A pseudo open channel may therefore be a normal group call with pre-defined or selected added features and facilities (i.e. supplementary services).

The supplementary services invoked during open channel operation may be classified in the following manner:

- SS that are essential: Access Priority (AP), see annex B, Priority Call (PC), see annex C, Pre-emptive Priority Call (PPC), see annex D, Call Retention (CR), see annex E;
- SS that may influence/modify open channel operation: Dynamic Group Number Assignment (DGNA), see annex H, Transfer of Control (TC), see annex J, Call Authorised by Dispatcher (CAD), see annex F, Late Entry (LE), see annex G;
- SS that are applicable in general: Area Selection (AS) Discreet Listening (DL) Calling Line Identity Presentation (CLIP) Calling Line Identification Restriction (CLIR) Talking Party Identification (TPI) Short Number Addressing (SNA) Call Hold (CH) Include Call (IC);
- SS that are not applicable: Ambiance Listening (AL) all types of call forwarding.

For a brief description of the supplementary services that are generally applicable or for those which are not applicable to open channel operation, refer to ETR 086-1 [1].

Open channel operation may check the presence of group members before allocating the open channel resources, with the drawback of a longer delay in call set-up time.

#### Scenario 1:

- pseudo open channel operation may be set up by all MS based on the services as previously described (dynamic set-up phase).

#### Scenario 2:

- the infrastructure (operator) may set up the open channel which is then offered to a set of MS. The open channel operation is invoked by setting up a call to a specific group address (GSSI) to which a certain number of added features (supplementary services) are attached (pre-defined set-up). This scenario does not differ from an ordinary group call, see annex A, though the performance may depend on the network capabilities.

In conclusion, any authorised user may set up an open channel by use of the normal call set-up procedure. The infrastructure could operate differently if the open channel is already established. Group addresses should be reserved for open channel operation. This would suggest that a new attribute is required to denote open channel operation. There may be restrictions placed upon the destination address to which the authorised user may establish open channel operation.

These subjects will be fully covered within the TETRA Voice plus Data standard.

## 6 Other users perception of the open channel operation

### 6.1 Single timeslot open channel operation

When the open channel operation users are no longer using the open channel resource, the infrastructure may re-use the channel capacity for any other purpose, e.g.:

- for packet data transmission, which is most robust (resistant) against sudden transfer interruption;

- for signalling purposes, e.g. extending the Main Control CHannel (MCCH) capacity by creating an Extended Control CHannel (ECCH) onto which the open channel users may stay in addition to other users, etc.

Open channel operation will impose some constraints on other calls (e.g. individual or group calls) re-using the resource capacity while there is no specific demand from the open channel users for that capacity.

For the other users, the constraints may be:

- the service (call) cannot be guaranteed during the whole transaction or call duration;
- there may be some restrictions on the duration of the call;
- there may be some restrictions on the duration of a transaction;
- there may be (short) interruption of the service, with re-establishment by the infrastructure;
- there may be call disconnection by the infrastructure during a transaction (with notification of the disconnect cause).

## **6.2 Distinction between group call and circuit mode data**

During open channel operation, the main difference between group call and circuit mode data is in the throughput. For single timeslot operation, there is no distinction. In circuit mode data, higher throughput is achieved by extending the circuit over several timeslots, up to 4, within the frame. Hence, other users should perceive the circuit mode data as several group calls running in parallel. At the extreme, a total carrier frequency could be devoted to a circuit mode data call during its operation, with the exception of an opportunity for signalling in the 18th frame.

# **7 Optimisation of the call set-up protocol**

## **7.1 Definition of performance parameters**

### **7.1.1 Open channel establishment time**

The initial call set-up phase to establish open channel operation may be slower than the time to establish a normal group call. However, it is not likely to be any slower than the call establishment of a group call with the same additional features (supplementary services) as outlined in clause 5. Two methods may be used as shown in figures 1 and 2, whereby:

- pre-defined features at subscription associated with a (reserved) group address (not shown); or
- the required basic and supplementary services are requested dynamically from the infrastructure by the MS.

Depending on the infrastructure, the pre-defined method performance should be equivalent to a normal group call establishment. However, the dynamic method results in additional set-up messages, and hence takes a longer period of time, as shown by comparison between figure 1 and figure 2.

Open channel operation, off air set-up, no presence indication, same cell

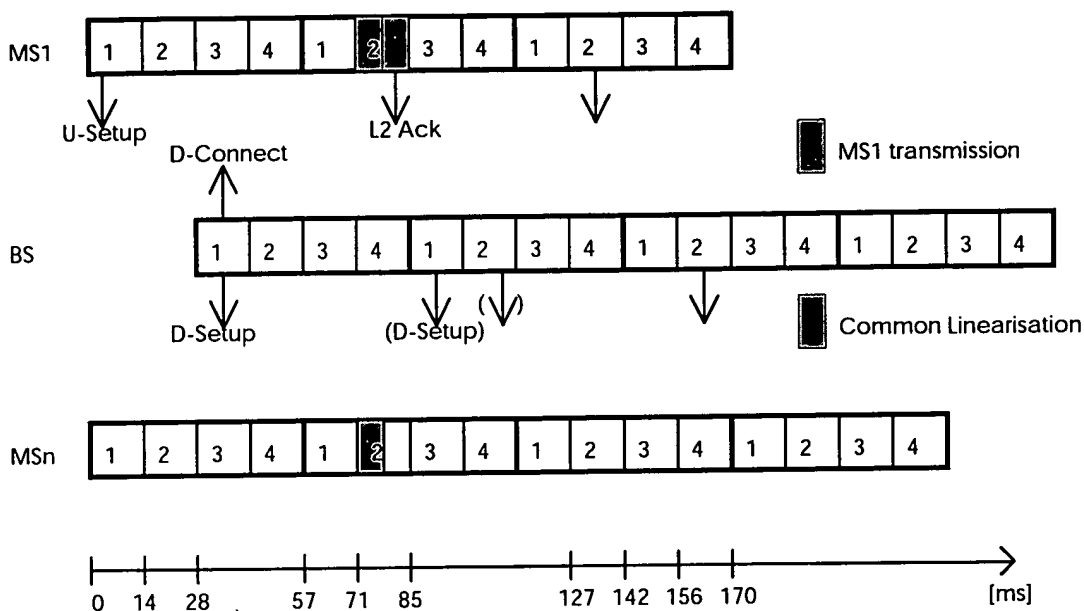


Figure 1: Call set-up message timing sequence for open channel operation (pre-defined)

Open channel operation, off air set-up, no presence indication, same cell

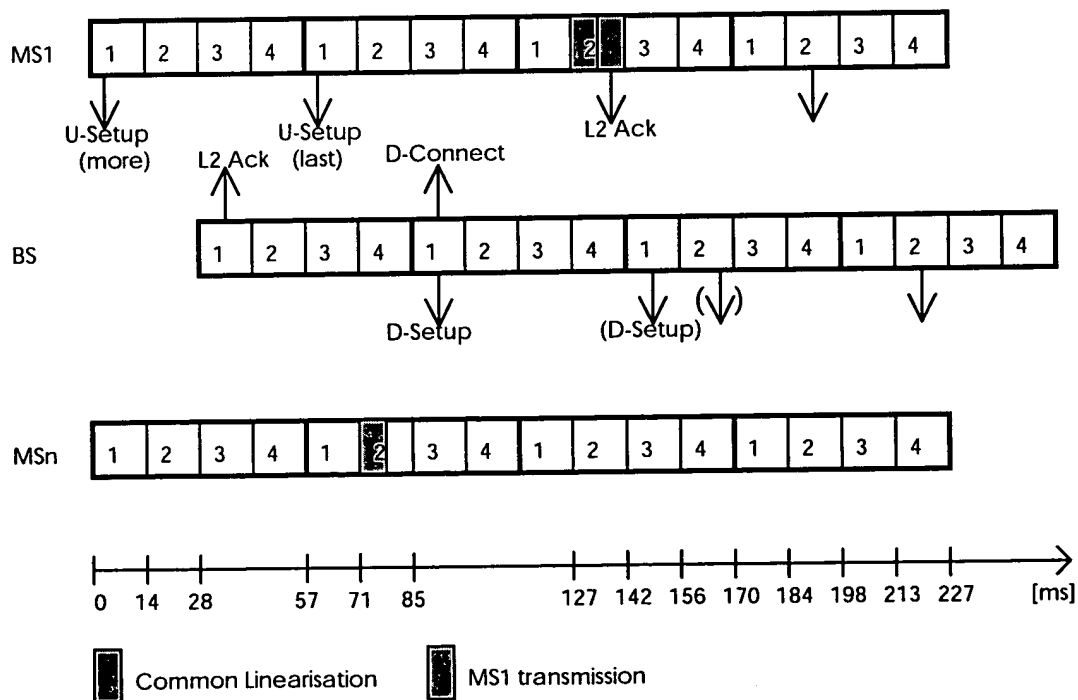


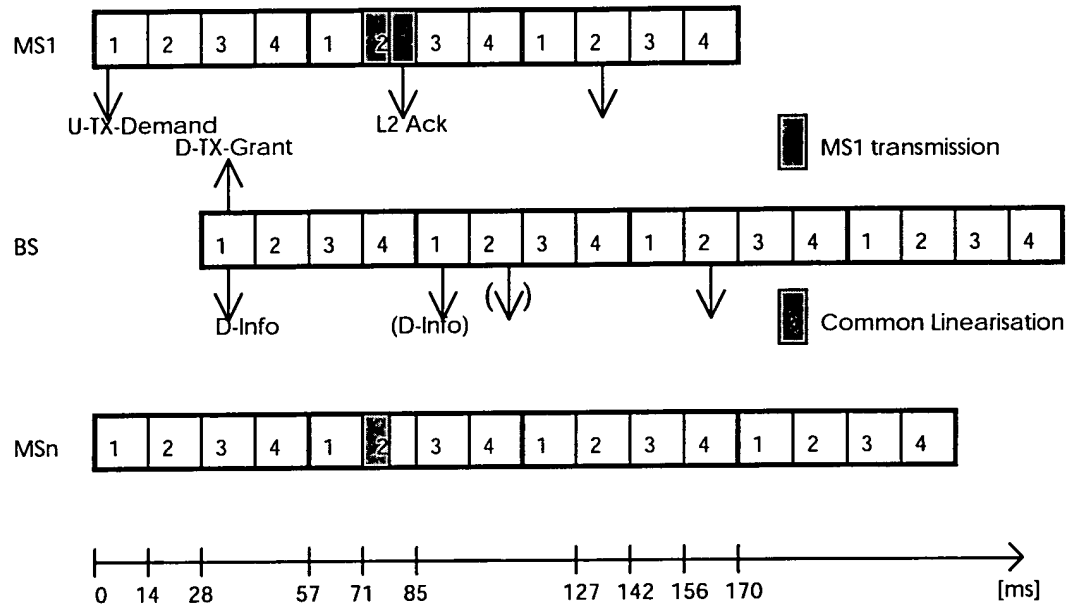
Figure 2: Call set-up message timing sequence for open channel operation (dynamic)

NOTE: The scenarios and timing provided in figures 1 and 2 illustrate optimum system performance. Due to infrastructure load and implementation, additional delay may be encountered between message exchanges.

### 7.1.2 Transaction set-up time

This phase should be faster on a highly, or abnormally, loaded system than for normal group call operation because of the relatively higher priority attributed to the open channel. In the case of a normal or lightly loaded system, it is unlikely that there will be any difference in performance. In the case where the priorities are equal, it is unlikely that there will be any difference in performance.

#### Open channel operation transaction set-up, same cell



NOTE: The scenarios and timing provided here illustrate optimum system performance. Due to infrastructure load and implementation, additional delay may be encountered between message exchanges.

This delay may be caused by:

- reduced access invitations;
- re-organisation of system capacity (e.g. frequency/timeslot re-assignment);
- additional signalling to pre-empt on-going transmitter resources);
- contention problems with the U-TX-Demand message sent on a random access;
- delay to decode and react on layer 3 messages.

Figure 3: Transaction set-up message timing sequence for open channel operation

### 7.1.3 Resource gain of pseudo open channel versus open channel operation

This allows other capacity for e.g. packet data, depending on the number of open channels, channel occupancy and other traffic channels availability in the system.

### 7.1.4 Channel availability versus system load

The channel availability depends on the use of pre-emptive priority and the call retention used by existing calls. The combination of the various priority supplementary services will give the best chance to get a resource after being able to access to the system. Different access groups may share the same access

capacity. As an operator option, a certain amount of signalling capacity may be reserved to provide means for the open channel users to access the system easily and rapidly.

#### 7.1.5 End of transaction mechanism

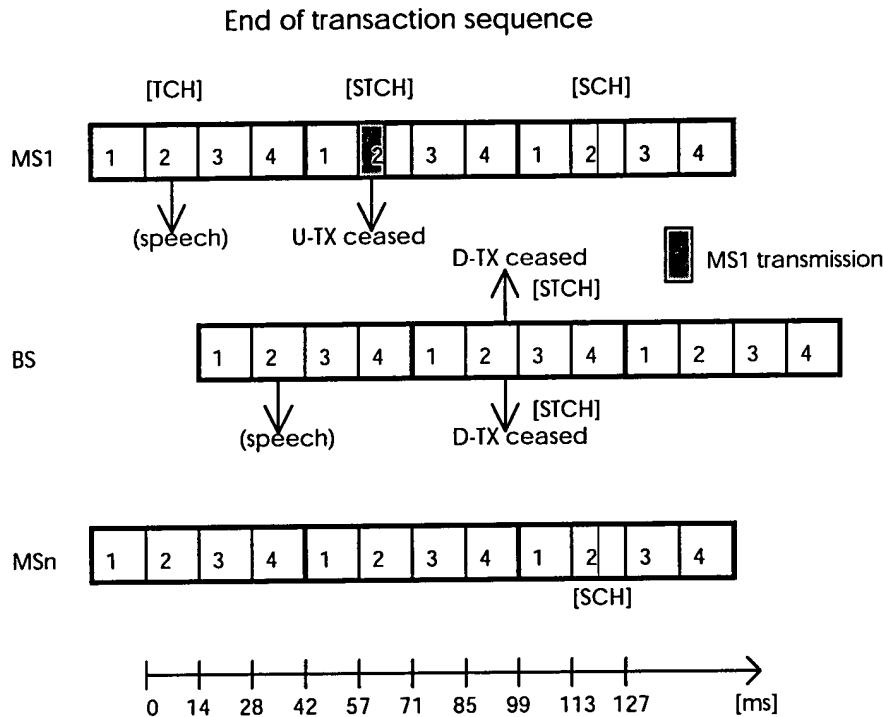


Figure 4: End of transaction timing sequence and return to signalling mode for open channel operation

## 8 Optimisation of the supplementary services involved at the set-up

### 8.1 Definition of performance parameters

#### 8.1.1 Automatic invocation of supplementary services on call to GSSI

This feature is supposed to be defined at the subscription time. It may be changed during the open channel operation life, but will require the intervention of an operator. The gain of the static invocation, as illustrated in figure 1, is obvious as compared to figure 2 for the dynamic one. This is for open channel operation set-up time and resource consumption only. On the other hand, once established, the two methods will use the same transaction set-up procedure as illustrated in figure 3.

#### 8.1.2 Dynamic group address assignment

The operator may allocate a new group identity (GSSI) to dynamically created open channel operation. The open channel characteristics could have been defined by the operator himself and later on, a new group identity allocated to a certain number of open channel users. This will require the use of the dynamic group number addressing supplementary service (see annex H).

#### 8.1.3 Transfer of control on the open channel operation

The operator can transfer, at will, the control of the open channel operation to any user in the network by using transfer of control supplementary service (see annex J). This may be particularly useful to enable one member of the open channel operation that had required dynamic set-up by the operator to disconnect it without operator's intervention.



## **9 System performance parameters**

### **9.1 Modelling of the air interface protocol**

Open channel establishment and disconnection follow the same principles as described in annex A for group calls in transmission or message trunking.

#### **9.1.1 Transmission trunking mode of operation**

The benefit of this approach is the re-use of radio resources while they are not being used by the members of open channel operation. It is pseudo open channel.

#### **9.1.2 Message trunking mode of operation**

The resources are not shared with users other than those in the open channel. It may be regarded as a dedicated channel on which the users will exchange their information and signalling to the infrastructure.

## **10 Composition of annexes**

The following informative annexes A to J describe the various functionalities used in the establishment, during the lifetime, and at the end of an open channel. The supplementary services are listed in order of decreasing importance for the open channel operation. Other supplementary services may also be invoked either in a pre-defined manner or dynamically.

## **Annex A (informative): Group voice call scenarios (TETRA 03.52)**

### **A.1 Procedures for message trunked systems**

#### **A.1.1 General**

All group calls are considered as employing only direct set-up signalling procedures. This procedure allows immediate communication to take place between the calling and called users without the necessity of having an alerting process and without an explicit response from the called user that he has answered. The called users normally go straight to the traffic channel.

For acknowledged group calls, it is an operator option if the call is to proceed immediately by giving the originator permission to transmit. Alternatively, the operator may choose to poll the MS on the traffic channel and act according upon the receipt of a response from the polled MS.

NOTE 1: This procedure is known as presence checking.

According to a predefined criteria the call may be allowed to proceed.

It is an operator option to disconnect the call if insufficient members are present, and the right to transmit has not yet been given.

It is an operator option to continue with presence checking beyond the point where the originator has been given permission to transmit.

NOTE 2: For clarity, the time sequence diagrams in this clause only show two participating members of the group call.

#### **A.1.2 Call set-up**

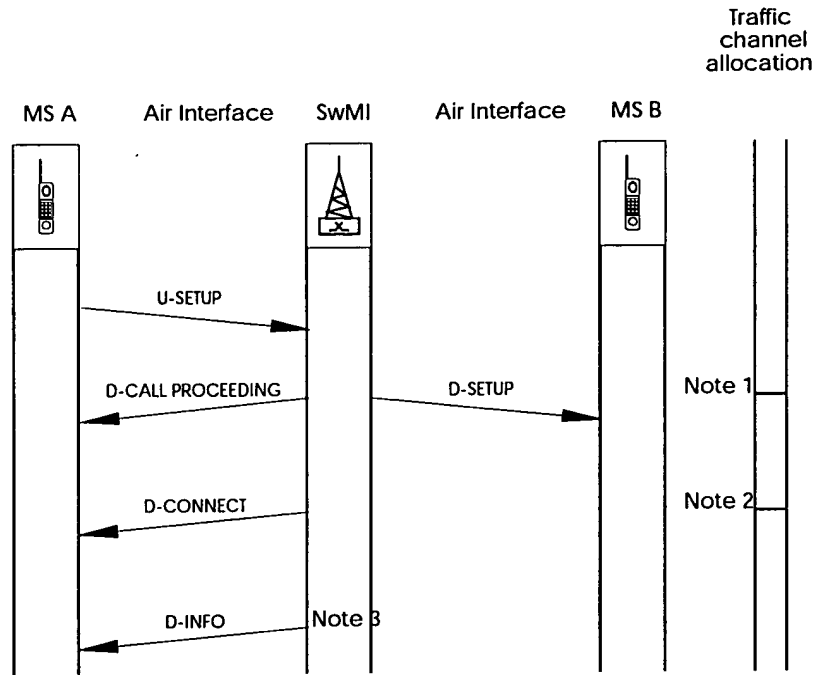
The call set-up request is started by an up-link message <U-SETUP> from the MS. The SwMI may optionally acknowledge the call set-up request by sending a down-link message <D-CALL PROCEEDING> to indicate that the call is being processed, see figure A.1.

If, following the receipt of a <U-SETUP> message, the SwMI determines that for some reason the call cannot be supported, then the SwMI initiates call clearing as defined in subclause A.1.9.

If the call can be supported, the SwMI sends a down-link message(s) <D-SETUP> to the called MS.

During, or as an option upon completion of, the transmission of the <D-SETUP> message, the SwMI may send a <D-CONNECT> message to the calling MS.

On completion of this procedure communication can commence.



NOTE 1: Early assignment, i.e., the calling MS and the called MS may be sent to the traffic channel at this stage.

NOTE 2: Late assignment, i.e., the calling MS may be sent to the traffic channel at this stage.

NOTE 3: For acknowledged group calls, the presence of the members of the group may be indicated here.

**Figure A.1: Call set-up phase for a group call in a message trunked system**

The option depends upon whether the group call is an acknowledged one. If it is acknowledged, the SwMI may delay the transmission of the <D-CONNECT> message to the calling MS, and wait for acknowledgements from the called MS before proceeding. If at this stage the SwMI decides that the call cannot be supported it initiates call clearing as defined in subclause A.1.9.

If the group call is acknowledged, the call owner may be informed of the presence of the other members of the group in the <D-INFO> message.

#### A.1.2.1 Traffic channel assignment

For the called MS, the traffic channel assignment is always given in the <D-SET-UP> message.

There are two methods for assigning a traffic channel to the calling MS:

- 1) early assignment: the traffic channel is assigned and indicated to the calling MS along with the <D-CALL PROCEEDING>, (contained in the lower layer part of that message). In this case the calling MS moves immediately to the channel that has been made available as the future traffic channel, and receives all further call control messages on this channel in anticipation of the call; or
- 2) late assignment: the traffic channel is not assigned until appropriate conditions are met.

NOTE: These conditions may be as a result of the finite time required to locate group members, or as a result of the call being acknowledged. In this case the calling MS remains listening on the control channel (or other if instructed by the SwMI), until it is told to move to the traffic channel. The traffic channel is indicated to the calling MS along with the <D-CONNECT> message, (contained in the lower layer part of that message).

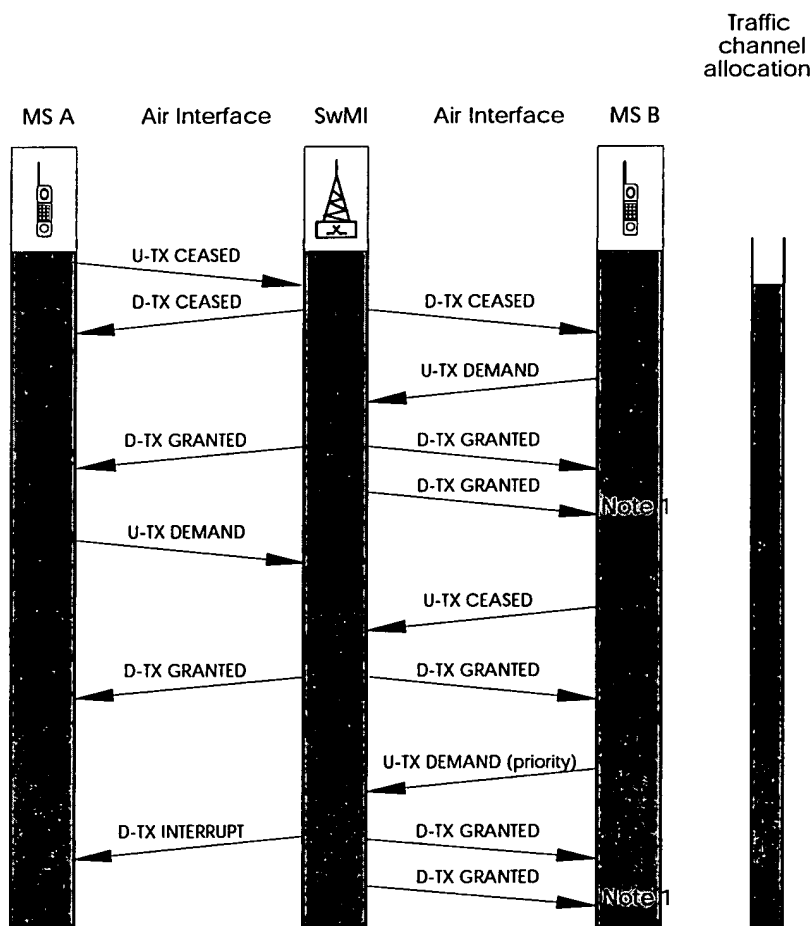
### A.1.3 Request-to-transmit

The SwMI is in full control over which MS is allowed to transmit because the MS is obliged to request permission to transmit, and permission must be granted before the MS can do so.

It is normal system operation that the calling MS will be given the permission to transmit immediately upon call set-up. Traffic channel assignment is as previously discussed in subclause A.1.2.

When the awarded MS has finished the communication it sends a <U-TX CEASED>, see figure A.2.

Upon receipt of the <U-TX CEASED> message, the SwMI sends a <D-INFO> message to the "receiving" MS to inform them that the transmission has now ceased. The SwMI awaits further demands from the calling and called MS. When any MS wishes to make a request to transmit, it sends a <U-TX DEMAND> message. The response to this request is dealt with in subclause A.1.4.



NOTE: D-TX granted is sent to the remaining members of the group upon awarding permission to MS B.

Figure A.2: Request to transmit for a group call in a message trunked system

### A.1.4 Response to request-to-transmit

During any call, a <U-TX DEMAND> message may be sent by any MS. If any other MS is not already transmitting, then the SwMI may response with a <D-TX GRANTED> message sent to the awarded MS addressed by his Individual TETRA Subscriber Identity (ITSI), and a D-<INFO> sent to the remaining MS addressed by the Group TETRA Subscriber Identity (GTSI), see figure A.2.

If a <U-TX DEMAND> message is sent and another MS is already transmitting, then the SwMI waits for that MS to finish it's transmission, (identified by the receipt of a <U-TX CEASED> message).

Subsequently the SwMI sends a <D-TX GRANTED> message to the requesting MS addressed by his ITSI, awarding permission to transmit, and a <D-INFO> message to the remaining MS, addressed by the GTSI. Priority requests are dealt with under subclause A.1.8.

#### **A.1.5 Permission to transmit withdrawn**

The SwMI may decide to interrupt transmission when resources are required for another call or that the SwMI requires that the call should temporarily pause. In this case the SwMI sends a <D-TX WAIT> message to all MS. Permission to transmit is be withdrawn, or is not given to a requesting MS. The MS should obey channel allocation and await further instructions on the channel that they have been directed to. The <D-TX WAIT> will:

- confirm to the MS that the call is in a queue;
- indicate to the MS that they may not send further requests-to-transmit.

If the request-to-transmit is granted but queued, the MS is allowed to withdraw its request-to-transmit by means of the message <U-TX CEASED>.

#### **A.1.6 Permission to continue with withdrawn call**

When the SwMI has decided that the call can continue, the SwMI sends a <D-TX GRANTED> message to the awarded MS, addressed by his ITSI, and a <D-TX CONTINUE> message to all remaining MS, addressed by the GTSI. The MS are told to go to the traffic channel.

If no MS have been given permission to transmit then they are sent a <D-TX CONTINUE> message and are free to make a request to the SwMI.

#### **A.1.7 End of transmission**

At the end of a communication, the MS sends <U-TX CEASED> and listens to the traffic channel, see figure A.2. The SwMI sends <D-INFO> to all participants addressed by the GTSI to inform them that the transmission has now ceased.

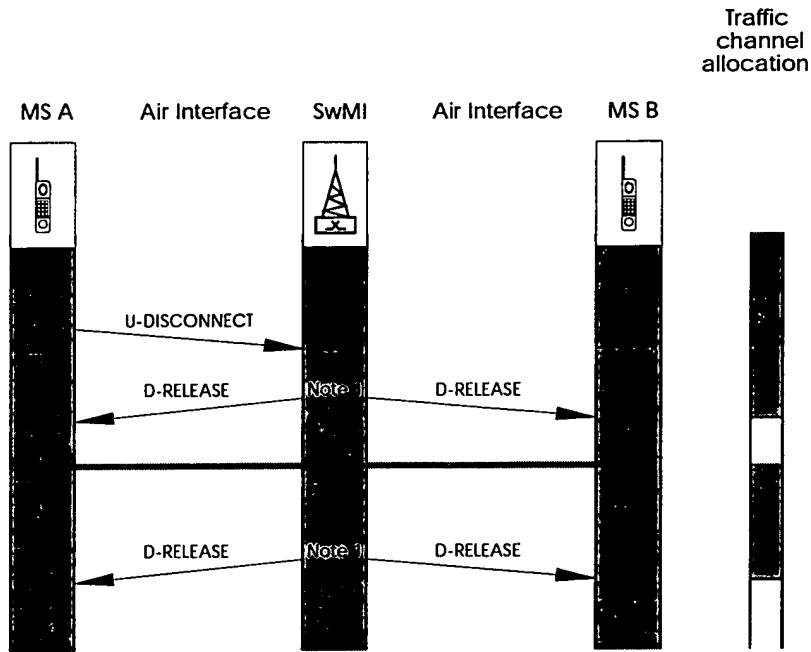
#### **A.1.8 Stop-transmission order**

If, during the course of a transmission, a MS wishes to interrupt the transmitting MS with a higher priority request, a <U-TX DEMAND> message is sent indicating the level of priority, the SwMI sends a <D-INTERRUPT> message to the transmitting MS addressed by his ITSI, a <D-TX GRANTED> message to the awarded MS, addressed by his ITSI and a <D-INFO> to all other MS, addressed by the GTSI. All messages indicate that the permission to transmit has been re-awarded and should indicate the level of priority, see figure A.2.

#### **A.1.9 Call clearing**

##### **A.1.9.1 Mobile originated**

The call owner may disconnect the call at any stage of the call, see figure A.3. Only the call owner can complete this operation. The MS originated call clearing procedure is started by the call owner sending an up-link <U-DISCONNECT> message. The SwMI responds to this message by sending a down-link <D-RELEASE> message to all MS and they are released from the call.



NOTE: The SwMI may start the CC-SS retention timer.

Figure A.3: Call clearing for a group call in a message trunked system

#### A.1.9.2 SwMI originated

In the case where the SwMI cannot support a request for a call from the calling MS, the SwMI sends a <D-RELEASE> message, containing the reason for failure, to the calling MS.

In the case where the SwMI can no longer support an established call, it sends a <D-RELEASE> message to all MS, containing the reason for disconnection, and subsequently releases the call.

### A.2 Procedures for transmission trunked systems

#### A.2.1 General

All group calls are considered as employing only direct set-up signalling procedures. This procedure allows immediate communication to take place between the calling and called users without the necessity of having an alerting process and without an explicit response from the called user that he has answered. The called users normally go straight to the traffic channel.

For acknowledged group calls, it is an operator option if the call is to proceed immediately by giving the originator permission to transmit. Alternatively, the operator may choose to poll the MS on the traffic channel and act according upon the a response from the polled MS.

NOTE 1: This procedure is known as presence checking.

According to a predefined criteria the call may be allowed to proceed.

It is an operator option to disconnect the call if insufficient members are present, and the right to transmit has not yet been given.

It is an operator option to continue with presence checking beyond the point where the originator has been given permission to transmit.

NOTE 2: For clarity, the time sequence diagrams in this clause only show two participating members of the group call.

### A.2.2 Call set-up

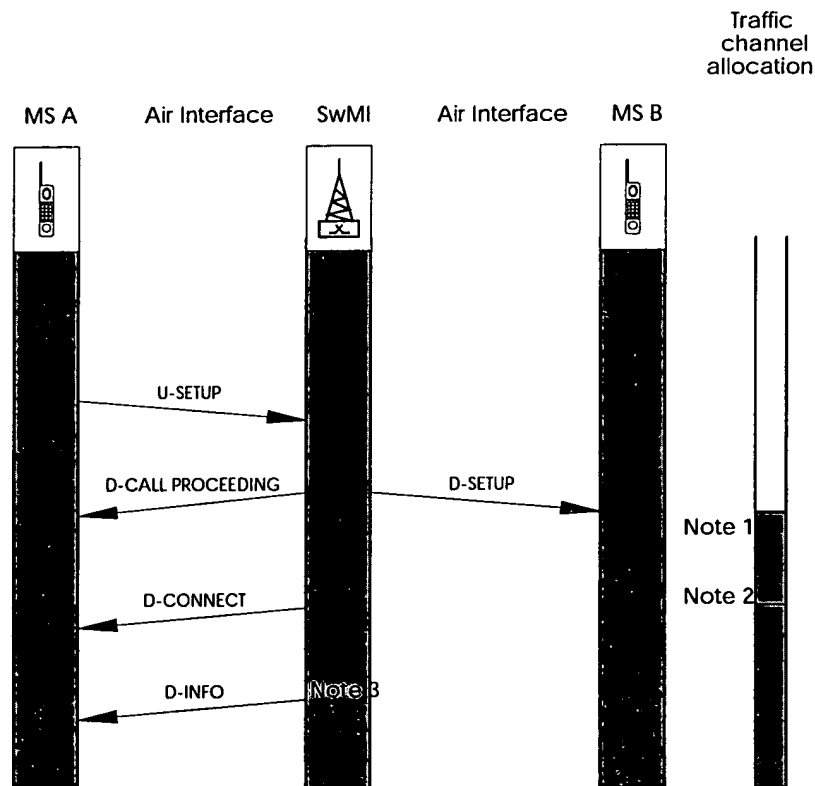
The call set-up request is started by an up-link message <U-SETUP> from the MS. The SwMI may optionally acknowledge the call set-up request by sending a down-link message <D-CALL PROCEEDING> and to indicate that the call is being processed, see figure A.4.

If following the receipt of a <U-SETUP> message, the SwMI determines that for some reason the call cannot be supported, then the SwMI may initiate call clearing as defined in subclause A.1.9.

If the call can be supported, the SwMI sends a down-link message <D-SETUP> to the called MS.

During, or as an option upon completion of, the transmission of the <D-SETUP> message, the SwMI sends a <D-CONNECT> message to the calling MS.

On completion of this procedure communication can commence.



NOTE 1: Late assignment, i.e. the called MS are sent to the traffic channel at this stage.

NOTE 2: The calling MS is sent to the traffic channel at this stage.

NOTE 3: For acknowledged group calls, the presence of the members of the group may be indicated here.

**Figure A.4: Call set-up phase for a group call in a transmission trunked system**

The option depends upon whether the group call is an acknowledged one. If it is acknowledged, the SwMI may delay the transmission of the <D-CONNECT> message to the calling MS, and wait for acknowledgements from the called MS before proceeding. If at this stage the SwMI decides that the call cannot be supported it may initiate call clearing as defined in subclause A.1.9.

If the group call is acknowledged, the call owner may be informed of the presence of the other members of the group in the <D-INFO> message.

#### **A.2.2.1 Traffic channel assignment**

For the called MS, the traffic channel assignment is given in the <D-SET-UP> message.

There is one method for assigning a traffic channel to the calling MS:

- late assignment: the traffic channel is not assigned until appropriate conditions are met.

NOTE: These conditions may be as a result of the finite time required to locate group members, or as a result of the call being acknowledged.

The traffic channel is indicated to the calling MS along with the <D-CONNECT> message, (contained in the lower layer part of that message). In this case the calling MS remains listening on the control channel (or other channel if instructed by the SwMI) until he is told to move to the traffic channel.

#### **A.2.3 Request-to-transmit**

The SwMI is in full control over which MS is allowed to transmit because the MS is obliged to request permission to transmit, and permission must be granted before the MS can do so.

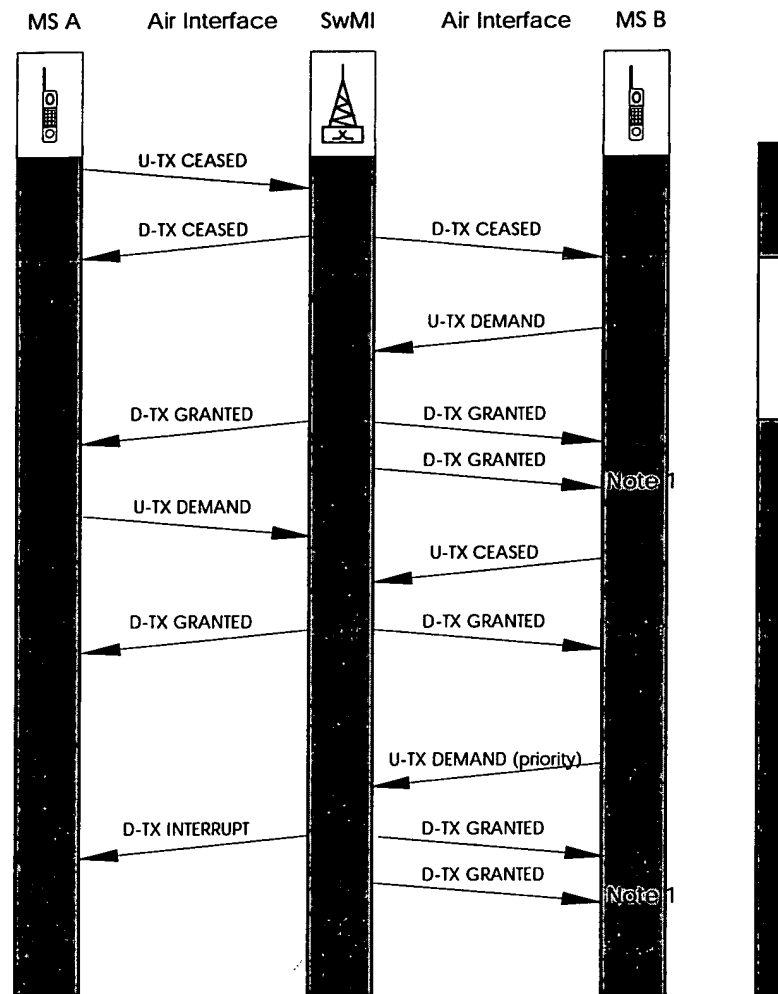
It is normal system operation that the calling MS is given the permission to transmit immediately upon call set-up. Traffic channel assignment is as previously discussed in subclause A.2.2.1.

When the awarded MS has finished the communication it sends a <U-TX CEASED>, see figure A.5.

Upon receipt of the <U-TX CEASED> message, the SwMI sends all MS a <D-TX CEASED> message, the MS obey channel allocation and the SwMI awaits further demands from the calling and called MS. When any MS wishes to make a request to transmit, it sends a <U-TX DEMAND> message. The response to this request is dealt with in subclause A.2.4.



Traffic  
channel  
allocation



NOTE: D-TX granted is sent to the remaining members of the group upon awarding permission to MS B.

Figure A.5: Request to transmit for a group call in a transmission trunked system

#### A.2.4 Response to request-to-transmit

During any call, a <U-TX DEMAND> message may be sent by any MS. If any other MS is not already transmitting, then the SwMI response should be a <D-TX GRANTED> message sent to the awarded MS addressed by his ITSI and a D-<INFO> sent to the remaining MS addressed by the GTSI. The message may be accompanied by the traffic channel allocation (contained in the lower layer parts). Supplementary service information may also be appended to these messages if appropriate, see figure A.5.

If a <U-TX DEMAND> message is sent and another MS is already transmitting, then the SwMI should wait for that party to finish the transmission, (identified by the receipt of a <U-TX CEASED> message). Subsequently the SwMI sends a <D-TX GRANTED> message to the requesting MS, addressed by his ITSI, awarding permission to transmit to him and a <D-INFORM> message to the remaining MS, addressed by the GTSI. (If the SwMI wishes to change the traffic channel, then this instruction may also be appended to the <D-TX GRANTED> and <D-INFORM> messages.) Priority requests are dealt with in subclause A.2.8.

#### **A.2.5 Permission to transmit withdrawn**

The SwMI may decide to interrupt transmission when resources are required for another call or that the SwMI requires that the call should temporarily pause. In this case the SwMI sends a <D-TX WAIT> message to all MS. Permission to transmit is withdrawn, or is not given to a requesting MS. The MS should obey channel allocation and await further instructions on the channel that they have been directed to.

If the request-to-transmit is granted but queued, the MS is allowed to withdraw its request-to-transmit by means of the message <U-TX CEASED>. The <D-TX WAIT> will:

- confirm to the MS that the call is in a queue;
- indicate to the MS that they may not send further requests-to-transmit.

#### **A.2.6 Permission to continue with withdrawn call**

When the SwMI has decided that the call can continue, the SwMI sends a <D-TX GRANTED> message to the awarded MS, addressed by his ITSI, and a <D-TX CONTINUE> message to all remaining MS addressed by the GTSI. The MS are then told to go to the traffic channel.

On the other hand, If no MS have been given permission to transmit then they may be sent a <D-TX CONTINUE> message and are not sent to the traffic channel. They are free to make a request to the SwMI.

#### **A.2.7 End of transmission**

At the end of a transmission, the MS sends <U-TX CEASED>. The SwMI sends a <D-TX CEASED> to all MS's to return them to the control channel, (unless another MS has asked for permission to transmit -see subclause A.2.4), see figure A.5.

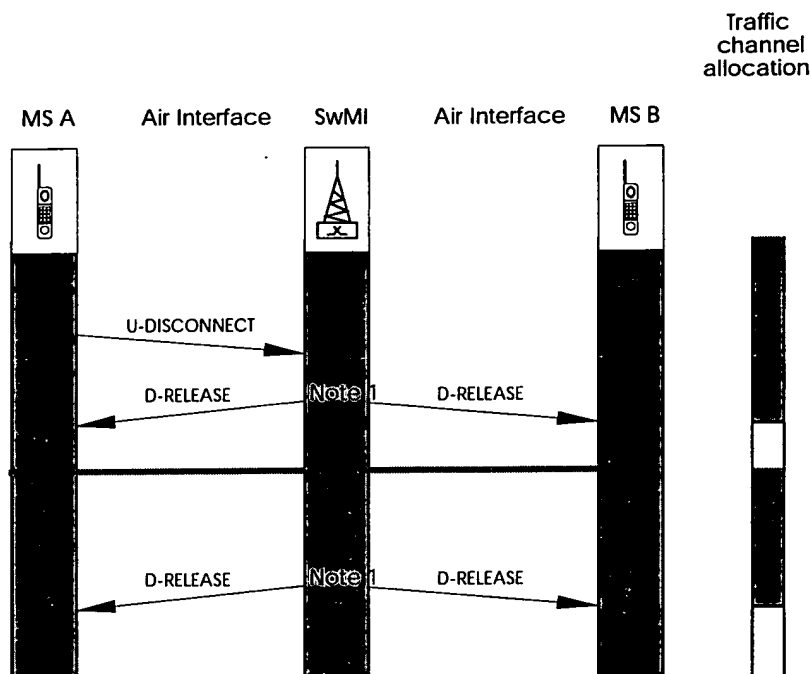
#### **A.2.8 Stop-transmission order**

If, during the course of a transmission, a MS wishes to interrupt the transmitting MS with a higher priority request, a <U-TX DEMAND> message is sent indicating the level of priority, the SwMI sends a <D-INTERRUPT> message to the transmitting MS addressed by his ITSI, a <D-TX GRANTED> message to the awarded MS, addressed by his ITSI and a <D-INFO> to all other MS, addressed by the GTSI. All messages indicate that the permission to transmit has been re-awarded and indicate the level of priority. (If the SwMI wishes to change the traffic channel, then this instruction may also be appended to the <D-TX GRANTED>, <D-INTERRUPT> and <D-INFO> messages), see figure A.5.

#### **A.2.9 Call clearing**

##### **A.2.9.1 Mobile originated**

The call owner may disconnect the call at any stage of the call, see figure A.6. Only the call owner can complete this operation. The MS originated call clearing procedure is started by the call owner sending an up-link <U-DISCONNECT> message. The SwMI may respond to this message by sending a down-link <D-RELEASE> message to all MS and they are released from the call.



NOTE: The SwMI may start the CC-SS retention timer.

Figure A.6: Call clearing for a group call in a transmission trunked system

#### A.2.9.2 SwMI originated

In the case where the SwMI cannot support a request for a call from the calling MS, the SwMI may send a <D-RELEASE> message, containing the reason for failure, to the calling MS.

In the case where the SwMI can no longer support an established call, it may send a <D-RELEASE> message to all MS, containing the reason for disconnection, and subsequently release the call.

### A.3 Procedures for quasi-transmission trunked systems

#### A.3.1 General

All group calls are considered as employing only direct set-up signalling procedures. This procedure allows immediate communication to take place between the calling and called users without the necessity of having an alerting process and without an explicit response from the called user that he has answered. The called users normally go straight to the traffic channel.

For acknowledged group calls, it is an operator option if the call is to proceed immediately by giving the originator permission to transmit. Alternatively, the operator may choose to poll the MS on the traffic channel and act according upon the receipt of a response from the polled MS.

NOTE 1: This procedure is known as presence checking.

According to a predefined criteria the call may be allowed to proceed.

It is an operator option to disconnect the call if insufficient members are present, and the right to transmit has not yet been given.

It is an operator option to continue with presence checking beyond the point where the originator has been given permission to transmit.

NOTE 2: For clarity, the time sequence diagrams in this clause only show two participating members of the group call.

### A.3.2 Call set-up

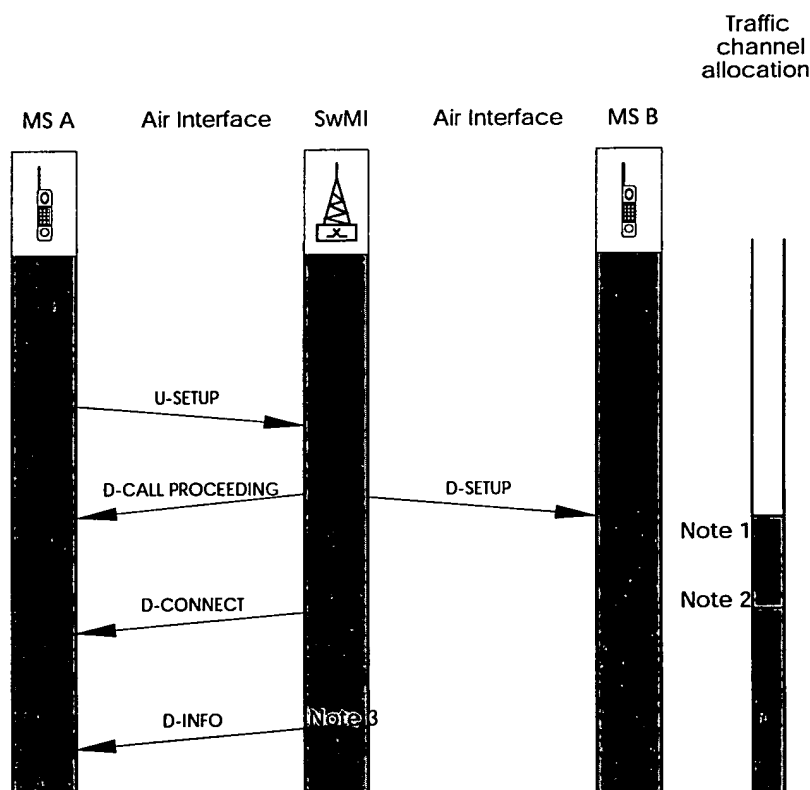
The call set-up request is started by an up-link message <U-SETUP> from the MS. The SwMI may optionally acknowledge the call set-up request by sending a down-link message <D-CALL PROCEEDING> and to indicate that the call is being processed, see figure A.7.

If following the receipt of a <U-SETUP> message, the SwMI determines that for some reason the call cannot be supported, then the SwMI initiates call clearing as defined in subclause A.3.9.

If the call can be supported, the SwMI sends a down-link message <D-SETUP> to the called MS.

During, or as an option upon completion of, the transmission of the <D-SETUP> message, the SwMI may send a <D-CONNECT> message to the calling MS.

On completion of this procedure communication can commence.



NOTE 1: Late assignment, i.e. the called MS are sent to the traffic channel at this stage.

NOTE 2: The calling MS is sent to the traffic channel at this stage.

NOTE 3: For acknowledged group calls, the presence of the members of the group may be indicated here.

**Figure A.7: Call set-up phase for a group call in a quasi-transmission trunked system**

The option depends upon whether the group call is an acknowledged one. If it is acknowledged, the SwMI may delay the transmission of the <D-CONNECT> message to the calling MS, and wait for acknowledgements from the called MS before proceeding. If at this stage the SwMI decides that the call cannot be supported it initiates call clearing as defined in subclause A.3.9.

If the group call is acknowledged, the call owner may be informed of the presence of the other members of the group in the <D-INFO> message.

#### **A.3.2.1 Traffic channel assignment**

For the called MS, the traffic channel assignment is always given in the <D-SET-UP> message.

There is one method for assigning a traffic channel to the calling MS:

- late assignment: the traffic channel is not assigned until appropriate conditions are met. (These conditions may be as a result of the finite time required to locate group members, or as a result of the call being acknowledged.) The traffic channel is indicated to the calling MS along with the <D-CONNECT> message, (contained in the lower layer part of that message). In this case the calling MS remains listening on the control channel until he is told to move to the traffic channel.

#### **A.3.3 Request-to-transmit**

The SwMI is in full control over which MS is allowed to transmit because the MS is obliged to request permission to transmit, and permission must be granted before the MS can do so.

It is normal system operation that the calling MS will be given the permission to transmit immediately upon call set-up. Traffic channel assignment is as previously discussed in subclause A.3.2.1.

When the awarded MS has finished the communication it sends a <U-TX CEASED>, see figure A.8.

Upon receipt of the <U-TX CEASED> message, the SwMI starts a timer (hang time) and sends a <D-INFO> message to the "receiving" MS to inform them that the transmission has now ceased. After expiry of the timer, and no MS have sent any messages, the SwMI may send all MS a <D-TX CEASED> message, the MS should obey channel allocation and the SwMI awaits further demands from the calling and called MS. When any MS wishes to make a request to transmit, he sends a <U-TX DEMAND> message. The response to this request is dealt with in subclause A.3.4.

If the hang time is infinite the TETRA system becomes message trunked.

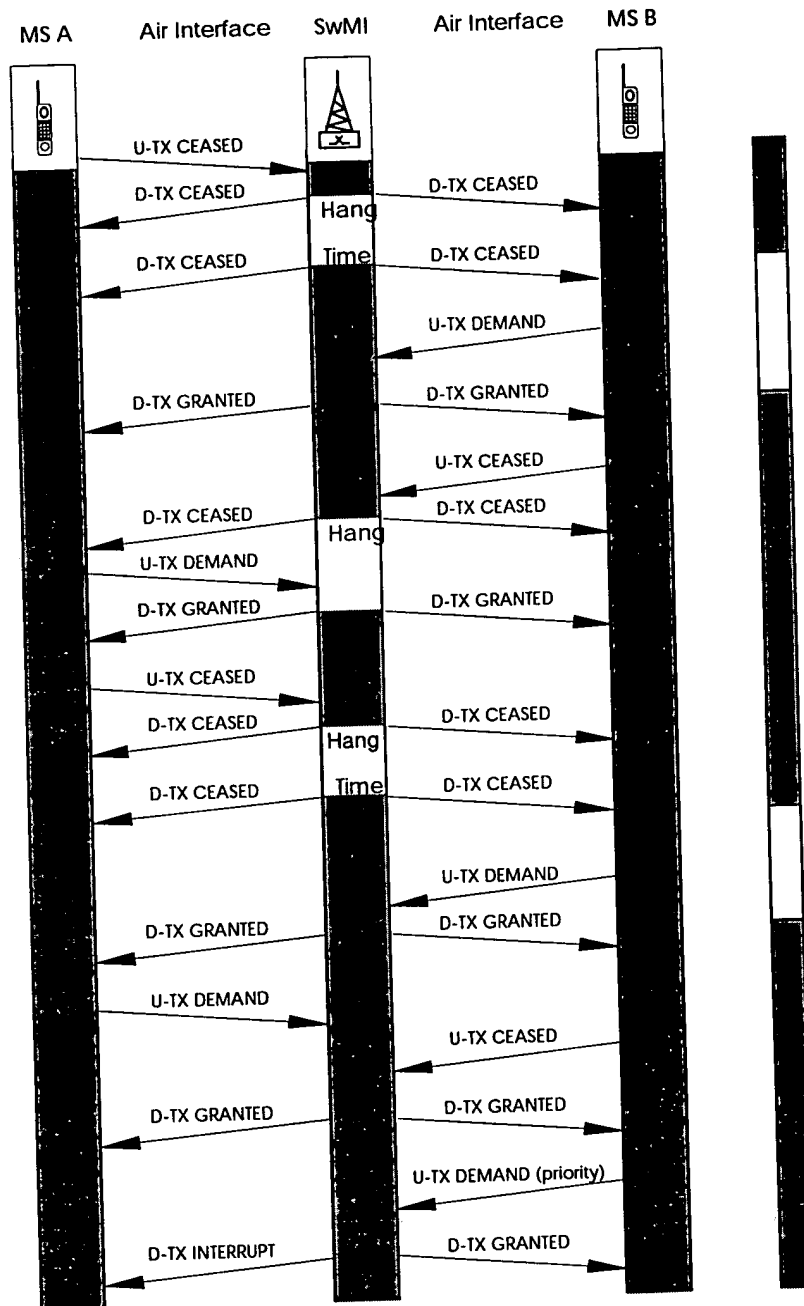


Figure A.8: Request to transmit for a group call in a quasi-transmission trunked system

#### A.3.4 Response to request-to-transmit

During any call, a <U-TX DEMAND> message may be sent by any MS. If any other MS is not already transmitting, and the hang timer has expired, then the SwMI response is a <D-TX GRANTED> message sent to the awarded MS addressed by his ITSI and a <D-INFO> message sent to the remaining MS addressed by the GTSI. The message should be accompanied by the traffic channel allocation (contained in the lower layer parts). Supplementary service information may also be appended to these messages if appropriate, see figure A.8.

If a <U-TX DEMAND> message is sent when no MS is transmitting, but the hang timer has not expired, then the SwMI response is a <D-TX GRANTED> message sent to the awarded MS addressed by his ITSI awarding permission to transmit to him, and a <D-INFO> message sent to the remaining MS addressed

by the GTSI. The MS are assumed to be still on the traffic channel and a new assignment is not necessarily given.

If a <U-TX DEMAND> message is sent and another MS is already transmitting, then the SwMI should wait for that party to finish the transmission, (identified by the receipt of a <U-TX CEASED> message). Subsequently the SwMI sends a <D-TX GRANTED> message, to the requesting MS, addressed by his ITSI, awarding permission to transmit to him, and a <D-INFO> message to the remaining MS, addressed by the GTSI. (If the SwMI wishes to change the traffic channel, then this instruction may also be appended to the <D-TX GRANTED> and <D-INFO> messages.) Priority requests are dealt with under subclause A.3.8.

#### **A.3.5 Permission to transmit withdrawn**

The SwMI may decide to interrupt transmission when resources are required for another call or that the SwMI requires that the call should temporarily pause. In this case the SwMI sends a <D-TX WAIT> message to all MS. Permission to transmit is withdrawn, or is not given to a requesting MS. The MS should obey channel allocation and should await further instructions on the channel that they have been directed to. The <D-TX WAIT> will:

- confirm to the MS that the call is in a queue;
- indicate to the MS that they may not send further requests-to-transmit.

If the request-to-transmit is granted but queued, the MS is allowed to withdraw its request-to-transmit by means of the message <U-TX CEASED>.

#### **A.3.6 Permission to continue with withdrawn call**

When the SwMI has decided that the call can continue, the SwMI should send a <D-TX GRANTED> message to the awarded MS, addressed by his ITSI, and a <D-TX CONTINUE> message to all remaining MS addressed by the GTSI. The MS are told to go to the traffic channel.

On the other hand, If no MS have been given permission to transmit then they are sent a <D-TX CONTINUE> message and are not sent to the traffic channel. They are free to make a request to the SwMI.

#### **A.3.7 End of transmission**

At the end of a transmission, the MS sends <U-TX CEASED> and listens to the traffic channel. Upon receipt of the <U-TX CEASED> message, the SwMI starts a timer (hang time) and sends a <D-INFO> message to the "receiving" MS to inform them that the transmission has now ceased. After expiry of the timer, and no MS have sent any messages, the SwMI sends all MS, addressed by the GTSI, the <D-TX CEASED> message which informs the MS to obey channel allocation and await further instructions on the channel that they have been directed to, see figure A.8.

#### **A.3.8 Stop-transmission order**

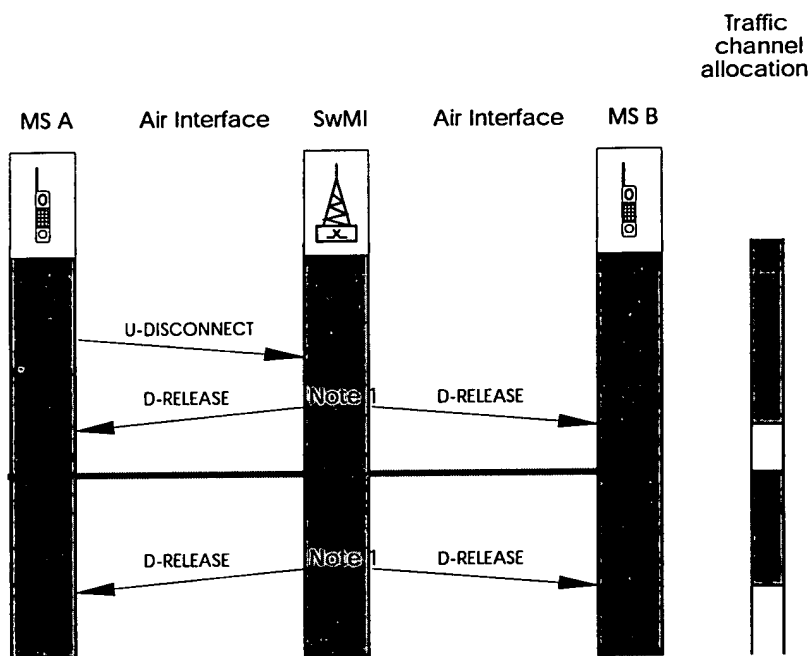
If, during the course of a transmission, a MS wishes to interrupt the transmitting MS with a higher priority request, a <U-TX DEMAND> message is sent indicating the level of priority, the SwMI sends a <D-INTERRUPT> message to the transmitting MS addressed by his ITSI, a <D-TX GRANTED> message to the awarded MS, addressed by his ITSI, and a <D-INFO> to all other MS addressed by the GTSI. All messages should indicate the permission to transmit has been re-awarded and should indicate the level of priority. (If the SwMI wishes to change the traffic channel, then this instruction may also be appended to the <D-TX GRANTED> and <D-INFO> messages), see figure A.8.

#### **A.3.9 Call clearing**

##### **A.3.9.1 Mobile originated**

The call owner may disconnect the call at any stage of the call, see figure A.9. Only the call owner can complete this operation. The MS originated call clearing procedure is started by the call owner sending an

up-link <U-DISCONNECT> message. The SwMI responds to this message by sending a down-link <D-RELEASE> message to all MS and they are released from the call.



NOTE: The SwMI may start the CC-SS retention timer.

Figure A.9: Call clearing for a group call in a quasi-transmission trunked system

#### A.3.9.2 SwMI originated

In the case where the SwMI cannot support a request for a call from the calling MS, the SwMI should send a <D-RELEASE> message, containing the reason for failure, to the calling MS.

In the case where the SwMI can no longer support an established call, it should send a <D-RELEASE> message to all MS, containing the reason for disconnection, and subsequently release the call.



## **Annex B (informative): Supplementary Service stage 1: Access Priority (SS-AP) (TETRA 03.69)**

### **B.1 Scope**

This draft Interim European Telecommunication Standard (I-ETS) defines the stage 1 specifications of the Supplementary Service Access Priority (SS-AP) for the Trans-European Trunked Radio (TETRA). Stage 1 is an overall service description from the users point of view but does not deal with the details of the human interface itself.

This I-ETS specifies the service description of the supplementary service and the procedures to be expected with successful and unsuccessful outcomes. In addition this I-ETS specifies the interactions with other TETRA supplementary services and interworking considerations.

Charging principles shall be outside the scope of this I-ETS.

The SS-AP enables a user to have preferential access to the TETRA system in times of radio link congestion.

### **B.2 Normative references**

This I-ETS incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this I-ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ITU-T Recommendation Z.100 (1993): "Specification and Description Language (SDL)".

### **B.3 Definitions and abbreviations (TETRA 01.04)**

#### **B.3.1 Definitions**

For the purposes of this I-ETS the following definitions apply:

**Access control:** the prevention of unauthorized use of resources, including the use of a resource in an unauthorized manner.

**Access priority level:** a value allocated to each mobile ITSI or GTSI/call type. It is used at the initial call set-up attempt to determine priority access across the air interface to the control functional entities.

**Served user:** the user making a request for service.

**Switching and Management Infrastructure (SwMI):** all of the TETRA equipment for a Voice plus Data (V+D) network except for subscriber terminals. The SwMI enables subscriber terminals to communicate with each other via the SwMI.

#### **B.3.2 Abbreviations**

##### **B.3.2.1 General abbreviations**

For the purposes of this I-ETS the following general abbreviations apply:

GTST	Group TETRA Subscriber Identity
ISDN	Integrated Services Digital Network
ISI	Inter System Interface
ITSI	Individual TETRA Subscriber Identity
LS	Line Station
PSTN	Public Switched Telephone Network
PTN	Private Telephone Network

SDL (Functional) Specification and Description Language  
SS Supplementary Service

NOTE: The abbreviation SS is only used when referring to a specific supplementary service.

SwMI Switching and Management Infrastructure  
TETRA Trans-European Trunked Radio

### B.3.2.2 Supplementary service abbreviations

For the purposes of this I-ETS the following supplementary service abbreviations apply:

SS-AL	Ambience Listening
SS-AoC	Advice of Charge
SS-AP	Access Priority
APL	Access Priority Level
SS-AS	Area Selection
SS-BIC	Barring of Incoming Calls
SS-BOC	Barring of Outgoing Calls
SS-CAD	Call Authorized by Dispatcher
SS-CCBS	Call Completion to Busy Subscriber
SS-CCNR	Call Completion on No Reply
SS-CFB	Call Forwarding on Busy
SS-CFNRY	Call Forwarding on No Reply
SS-CFNRC	Call Forwarding on Mobile Subscriber Not Reachable
SS-CFU	Call Forwarding Unconditional
SS-CLIP	Calling Line Identification Presentation
SS-CLIR	Calling/Connected Line Identification Restriction
SS-COLP	Connected Line Identification Presentation
SS-CR	Call Report
SS-CRT	Call Retention
SS-CW	Call Waiting
SS-DGNA	Dynamic Group Number Assignment
SS-DL	Discreet Listening
SS-HOLD	Call Hold
SS-IC	Include Call
SS-LE	Late Entry
SS-LSC	List Search Call
SS-PC	Priority Call
SS-PPC	Pre-emptive Priority Call
SS-SNA	Short Number Addressing
SS-TC	Transfer of Control
SS-TPI	Talking Party Identification

## B.4 Supplementary Service Access Priority (SS-AP) Stage 1 specification

### B.4.1 Description

#### B.4.1.1 General description

SS-AP enables the user to gain access to the TETRA system in times of radio link congestion. Preferential treatment shall apply to the uplink access to the control functional entities only.

The control functional entity enables the subscribers to, e.g.:

- make a registration;
- update the subscriber database;
- transfer of information for a supplementary service;
- make a call.

The network shall store the value of the Access Priority Level (APL) assigned to the Individual TETRA Subscriber Identity (ITSI) and/or Group TETRA Subscriber Identity (GTSI) and/or call types upon provision.

The TETRA infrastructure should periodically broadcast information relating to those mobiles which have been given permission to make an uplink access attempt. The basis for selection is an operator option dependent upon the network application, but may be based on any of the following:

- 1) an addressing range pre-designated by the operator;
- 2) a fleet basis;
- 3) a pre-determined user/operator agreement basis, such as a minimum occupancy level;
- 4) an access priority level subscription basis.

This I-ETS only considers case 4) above as an example, where each mobile operating on the network has been assigned an APL by the network provider. In a typical scenario there may be eight access priority levels, each one in turn giving an enhanced performance in times of radio access congestion.

Under normal circumstances when there is no congestion, all mobiles shall be permitted to make access attempts to the infrastructure. If the infrastructure wishes to regulate random access attempts the infrastructure should broadcast a change of APL. A user wishing to establish a call, (or transfer information to the infrastructure), under these circumstances shall firstly compare the broadcast message with his own APL. This shall be an automatic procedure carried out by the mobile. If the user's APL is greater than, or equal to, the broadcast APL, then he shall be able to make an initial call set-up attempt. If the user's APL is less than the broadcast APL then he shall not be able to make an initial call set-up attempt at that time and shall wait until the network changes the APL.

#### **B.4.1.2 Qualifications on applicability to telecommunication services**

This supplementary service shall be applicable to all TETRA circuit mode teleservices, to all TETRA circuit mode bearer services, and to the Short Data Service (SDS).

#### **B.4.2 Procedures**

##### **B.4.2.1 Provision and withdrawal**

Provision and withdrawal of SS-AP shall be by pre-arrangement with the service provider.

SS-AP shall be on a per TETRA number (ITSI/GTSI) basis. For each ITSI/GTSI, the supplementary service may be provided by subscription for every basic service subscribed to at that ITSI/GTSI, or for only some of the basic services subscribed to at that ITSI/GTSI.

##### **B.4.2.2 Normal procedures**

###### **B.4.2.2.1 Activation, deactivation, registration, and interrogation**

###### **B.4.2.2.1.1 Local activation and deactivation**

SS-AP may be activated by the service provider upon provision and deactivated upon withdrawal.

It may be possible for the served user to select the required access priority level on a per call basis, but the implementation shall be outside the scope of this I-ETS.

###### **B.4.2.2.1.2 Remote activation and deactivation**

As an implementation option it may be possible for an authorized/registered user to remotely activate or deactivate SS-AP on behalf of the served user, (e.g. as a dispatcher operation, or as a result of the invocation of SS-Dynamic Group Number Addressing (SS-DGNA)).

#### **B.4.2.2.1.3 Registration**

The infrastructure may support the registration of authorized users who may be allowed to carry out remote activation of the supplementary service for the served user. The registration process shall include the ITSI jurisdiction of the registered user.

#### **B.4.2.2.1.4 Interrogation**

The infrastructure may provide interrogation, which can be local, remote or both.

If local interrogation is provided, a TETRA network shall support interrogation on a per number basis for:

- all TETRA teleservices and bearer services as defined previously; and/or
- a user specified basic service.

The TETRA network response to an interrogation request shall provide the following information to the user:

- provided or not provided; and
- APL.

Remote interrogation may be possible by a special authorized user. The remote interrogation request and response shall include the information as specified for local interrogation and additionally the ITSI of the activating user.

#### **B.4.2.2.2 Invocation and operation**

The supplementary service shall be invoked by the infrastructure as a result of the downlink broadcast message. The supplementary service shall remain invoked within each mobile as long as the user subscribes to this service.

In the instance where there is no congestion across the air interface, the served user's call shall be set up in the normal manner.

The TETRA infrastructure shall periodically broadcast information relating to those mobiles which have been given permission to make an uplink access attempt.

When the uplink radio access resources have become congested, the infrastructure may change the broadcast access level message, depending upon the degree of congestion, or upon a pre-determined user/operator agreement, such as a minimum occupancy level.

A user wishing to establish a call under these circumstances shall firstly compare the broadcast message with his own APL. This shall be an automatic procedure carried out by the mobile. If the user's APL is greater than, or equal to, the broadcast APL, then he shall be able to make an initial call set-up attempt. If the user's APL is less than the broadcast APL then he shall not be able to make an initial call set-up attempt at that time and shall wait until the network changes the APL.

A user who has already established a connection when the broadcast APL changes shall not be affected in this manner.

#### **B.4.2.3 Exceptional procedures**

##### **B.4.2.3.1 Activation, deactivation, registration and interrogation**

###### **B.4.2.3.1.1 Activation and deactivation**

An exceptional activation may occur when the served user tries to assign a higher APL but has not subscribed to it. In such circumstances, the served user shall receive a notification that the activation has been disallowed and given the reason.

**NOTE:** The source of the notification is dependant on the implementation option. It is possible that the notification could be generated from the mobile or from the infrastructure, depending upon which entity checks the allowed values.

**B.4.2.3.1.2 Registration**

Exceptional procedures for registration shall not apply.

**B.4.2.3.1.3 Interrogation**

If the TETRA network cannot accept an interrogation request, the interrogating user shall receive a notification that SS-AP interrogation was unsuccessful. Possible causes for rejection can be:

- supplementary service not subscribed to;
- insufficient information;
- basic service to which relevance is requested is not subscribed to;
- unauthorized user.

**B.4.2.4.1 Invocation and operation**

Invocation of SS-AP shall be rejected by TETRA if the served user does not have the appropriate profile to use the service.

If the infrastructure cannot invoke the service, the cause shall be returned to the subscriber.

**B.4.3 Interactions with other supplementary services**

Interactions with other TETRA supplementary services are specified in subclauses B.4.3.1 to B.4.3.30.

**B.4.3.1 Calling Line Identification Presentation (SS-CLIP)**

SS-AP shall not have any interaction with SS-CLIP.

**B.4.3.2 Connected Line identification Presentation (SS-COLP)**

SS-AP shall not have any interaction with SS-COLP.

**B.4.3.3 Calling/Connected Line Identification Restriction (SS-CLIR)**

SS-AP shall not have any interaction with SS-CLIR.

**B.4.3.4 Call Report (SS-CR)**

SS-AP shall not have any interaction with SS-CR.

**B.4.3.5 Talking Party Identification (SS-TPI)**

SS-AP shall not have any interaction with SS-TPI.

**B.4.3.6 Call Forwarding Unconditional (SS-CFU)**

SS-AP shall not have any interaction with SS-CFU.

**B.4.3.7 Call Forwarding on mobile subscriber Busy (SS-CFB)**

SS-AP shall not have any interaction with SS-CFB.

**B.4.3.8 Call Forwarding on No Reply (SS-CFNRy)**

SS-AP shall not have any interaction with SS-CFNRy.

**B.4.3.9 Call Forwarding on mobile subscriber Not Reachable (SS-CFNRc)**

SS-AP shall not have any interaction with SS-CFNRc.

**B.4.3.10 List Search Call (SS-LSC)**

SS-AP shall not have any interaction with SS-LSC.

**B.4.3.11 Call Authorized by Dispatcher (SS-CAD)**

SS-AP shall not have any interaction with SS-CAD.

**B.4.3.12 Short Number Addressing (SS-SNA)**

SS-AP shall not have any interaction with SS-SNA.

**B.4.3.13 Area Selection (SS-AS)**

SS-AP shall not have any interaction with SS-AS.

**B.4.3.14 Access Priority (SS-AP)**

Not applicable.

**B.4.3.15 Priority Call (SS-PC)**

SS-AP shall not have any interaction with SS-PC.

**B.4.3.16 Call Waiting (SS-CW)**

SS-AP shall not have any interaction with SS-CW.

**B.4.3.17 Call Hold (SS-HOLD)**

SS-AP shall not have any interaction with SS-HOLD.

**B.4.3.18 Call Completion to Busy Subscriber (SS-CCBS)**

SS-AP shall not have any interaction with SS-CCBS.

**B.4.3.19 Late Entry (SS-LE)**

SS-AP shall not have any interaction with SS-LE.

**B.4.3.20 Transfer of Control (SS-TC)**

SS-AP shall not have any interaction with SS-TC.

**B.4.3.21 Pre-emptive Priority Call (SS-PPC)**

SS-AP shall not have any interaction with SS-PPC.

**B.4.3.22 Include Call (SS-IC)**

SS-AP shall not have any interaction with SS-IC.

**B.4.3.23 Advice of Charge (SS-AoC)**

SS-AP shall not have any interaction with SS-AoC.

**B.4.3.24 Barring of Outgoing Calls (SS-BOC)**

SS-AP shall not have any interaction with SS-BOC.

**B.4.3.25 Barring of Incoming Calls (SS-BIC)**

SS-AP shall not have any interaction with SS-BIC.

**B.4.3.26 Discreet Listening (SS-DL)**

SS-AP shall not have any interaction with SS-DL.

**B.4.3.27 Ambience Listening (SS-AL)**

SS-AP shall not have any interaction with SS-AL when it has been invoked by the dispatcher.

SS-AP shall not have any interaction with SS-AL when it has been self invoked.

**B.4.3.28 Dynamic Group Number Assignment (DGNA)**

If the served user has dynamically assigned a new group then the APL from the served user shall be downloaded to the members of the new group.

**B.4.3.29 Call Completion on No Reply (SS-CCNR)**

SS-AP shall not have any interaction with SS-CCNR.

**B.4.3.30 Call Retention (SS-CRT)**

SS-AP shall not have any interaction with SS-CRT.

**B.4.4 Interworking considerations**

When the served user moves to another TETRA network, he shall be informed of the existence of, or change to, his APL.

**B.4.5 Overall SDL**

Figures B.1 and B.2 contain the dynamic description of SS-AP using the Specification Description Language (SDL) defined in ITU-T Recommendation Z.100 [1]. The SDL process represents the behaviour of the network in providing SS-AP.

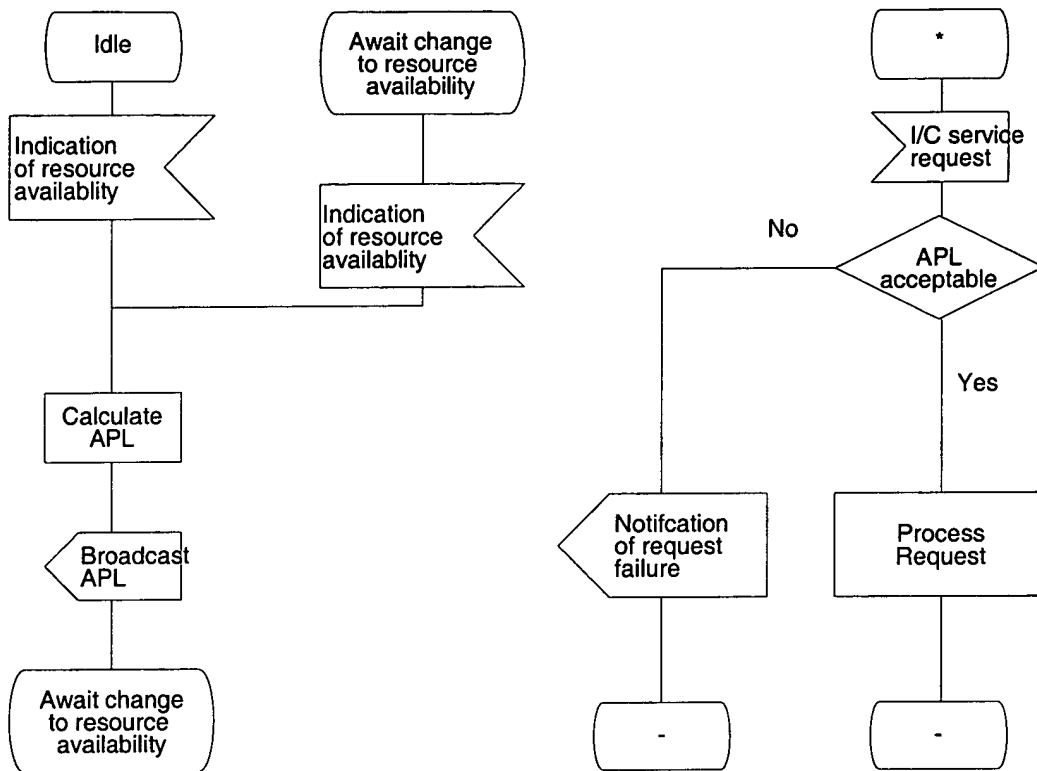


Figure B.1: SS-AP supplementary service, overall infrastructure SDL



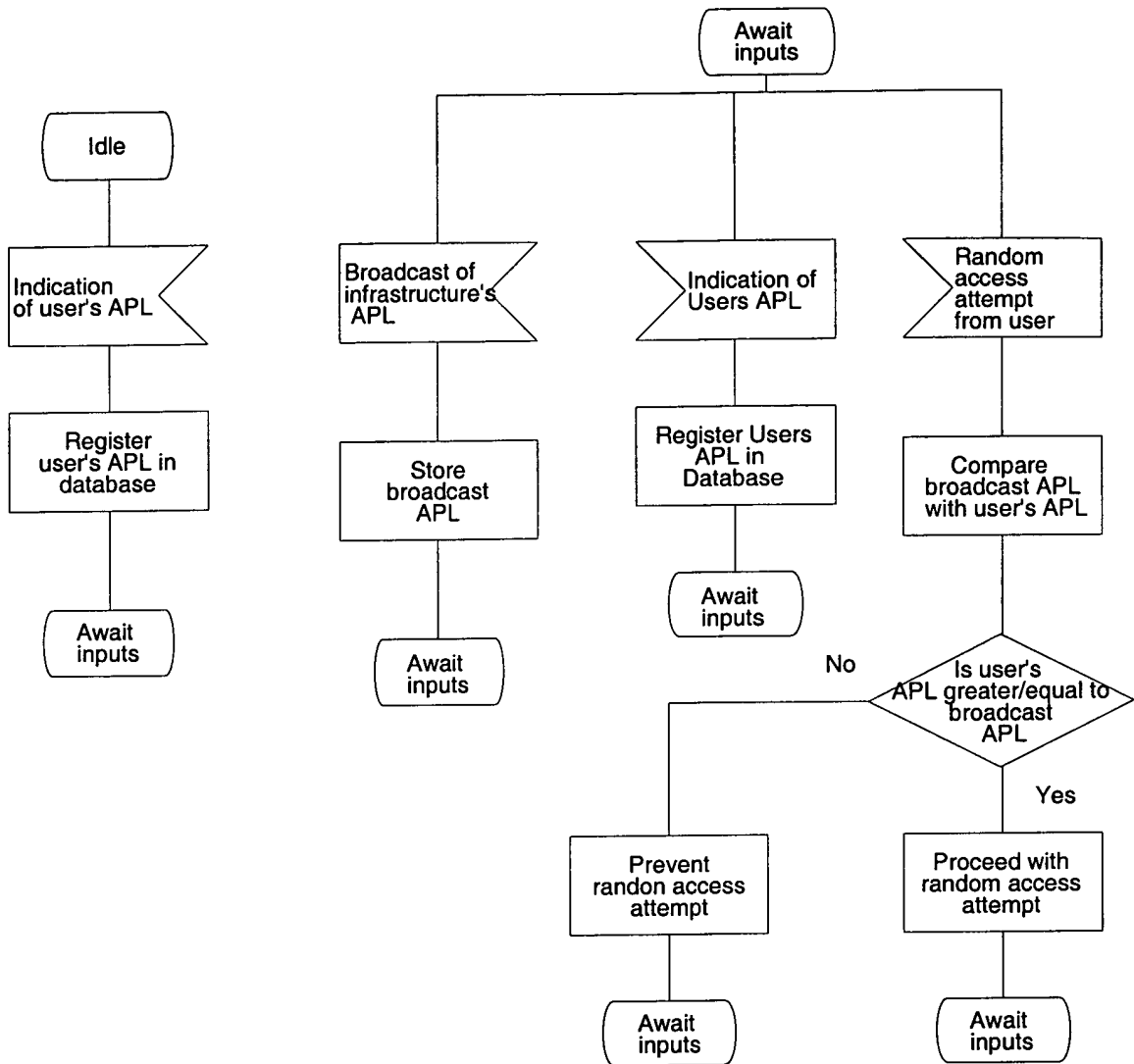


Figure B.2: SS-AP supplementary service, overall SDL

## **Annex C (informative): Supplementary Service stage 1: Priority Call (SS-PC) (TETRA 03.70)**

### **C.1 Scope**

This draft Interim European Telecommunication Standard (I-ETS) defines the stage 1 specifications of the Supplementary Service Priority Call (SS-PC) for the Trans-European Trunked Radio. Stage 1 is an overall service description from the users point of view but does not deal with the details of the human interface itself.

This I-ETS specifies the service description of the supplementary service and the procedures to be expected with successful and unsuccessful outcomes. In addition this I-ETS specifies the interactions with other TETRA supplementary services and interworking considerations.

Charging principles shall be outside the scope of this I-ETS.

The SS-PC enables a user to have preferential access to the network resources in the TETRA system.

### **C.2 Normative references**

This I-ETS incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this I-ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ITU-T Recommendation Z.100 (1993): "Specification and Description Language (SDL)".

### **C.3 Definitions, symbols and abbreviations (if any)**

#### **C.3.1 Definitions (TETRA 01.04)**

For the purposes of this I-ETS the following definitions apply:

**Access control:** the prevention of unauthorized use of resources, including the use of a resource in an unauthorized manner.

**Authorised user:** a user who is authorized to change the range of priority level of the served users calls.

**Broadcast call:** a multipoint call in which the same information is transmitted simultaneously by the calling terminal to all available terminals.

**Priority level:** a pre-agreed value allocated to each mobile ITS<sub>I</sub> or GTS<sub>I</sub> on a per call basis. It is used to determine priority access to network resources in the event of network congestion.

**Served user:** the call originator.

#### **C.3.2 Abbreviations (TETRA 01.04)**

##### **C.3.2.1 General abbreviations**

For the purposes of this I-ETS the following general abbreviations apply:

GTS <sub>I</sub>	Group TETRA Subscriber Identity
ISDN	Integrated Services Digital Network
ISI	Inter System Interface
ITS <sub>I</sub>	Individual TETRA Subscriber Identity
LS	Line Station
PSTN	Public Switched Telephone Network
PTN	Private Telephone Network

SDL (Functional) Specification and Description Language  
SS Supplementary Service

NOTE: The abbreviation SS is only used when referring to a specific supplementary service.

SwMI Switching and Management Infrastructure  
TETRA Trans-European Trunked Radio

### C.3.2.2 Supplementary service abbreviations

For the purposes of this I-ETS the following supplementary service abbreviations apply:

SS-AL	Ambience Listening
SS-AoC	Advice of Charge
SS-AP	Access Priority
SS-AS	Area Selection
SS-BIC	Barring of Incoming Calls
SS-BOC	Barring of Outgoing Calls
SS-CAD	Call Authorized by Dispatcher
SS-CCBS	Call Completion to Busy Subscriber
SS-CCNR	Call Completion on No Reply
SS-CFB	Call Forwarding on Busy
SS-CFNRy	Call Forwarding on No Reply
SS-CFNRC	Call Forwarding on Mobile Subscriber Not Reachable
SS-CFU	Call Forwarding Unconditional
SS-CLIP	Calling Line Identification Presentation
SS-CLIR	Calling/Connected Line Identification Restriction
SS-COLP	Connected Line Identification Presentation
SS-CR	Call Report
SS-CRT	Call Retention
SS-CW	Call Waiting
SS-DGNA	Dynamic Group Number Assignment
SS-DL	Discreet Listening
SS-HOLD	Call Hold
SS-IC	Include Call
SS-LE	Late Entry
SS-LSC	List Search Call
SS-PC	Priority Call
SS-PPC	Pre-emptive Priority Call
SS-SNA	Short Number Addressing
SS-TC	Transfer of Control
SS-TPI	Talking Party Identification

## C.4 Supplementary Service Priority Call (SS-PC) Stage 1 specification

### C.4.1 Description

#### C.4.1.1 General description

SS-PC allows the infrastructure to give priority access to network resources to calls which have been sent with priority status. The priority level shall not apply to the initial uplink access but shall apply to the resources across the infrastructure and to the radio link at the called user.

The priority level shall be sent with the initial call set-up message, (or the network may select a default level if the user has not chosen a level), and the level may be indicated to the called user as part of normal call control information.

In a typical scenario there may be eight priority levels, each one in turn giving an enhanced performance in times of network congestion. A call attempt that has been assigned a higher priority than another call attempt shall be given resources by the infrastructure in preference to a call attempt with lower priority.

The precise queuing procedure shall be an operator option.

The uses of priority level may be e.g.:

- to determine the priority of queuing for resources in the network;
- to indicate the importance of the incoming call to the called user.

#### **C.4.1.2 Qualifications on applicability to telecommunication services**

This supplementary service shall be applicable to all TETRA circuit mode teleservices and to all TETRA circuit mode bearer services except packet data services. It shall be applicable to the TETRA Short Data Service (SDS).

#### **C.4.2 Procedures**

##### **C.4.2.1 Provision and withdrawal**

Provision and withdrawal of SS-PC shall be by pre-arrangement with the service provider.

SS-PC shall be provided on a per TETRA number (ITSI/GTSI) basis. For each ITSI/GTSI, the supplementary service may be subscribed to for every basic service subscribed to at that ITSI/GTSI or for only some of the basic services subscribed to at that ITSI/GTSI. A user shall be provided with a range of priority levels within which he may select on a per call basis. In the case of GTSI's, each member of the group shall be downloaded with the associated priority level or priority level range at the same time as being downloaded with the GTSI.

##### **C.4.2.2 Normal procedures**

##### **C.4.2.2.1 Activation, deactivation, registration, and interrogation**

###### **C.4.2.2.1.1 Activation and deactivation**

SS-PC shall be activated by the service provider upon provision and deactivated upon withdrawal.

###### **C.4.2.2.1.2 Remote activation and deactivation**

As an implementation option it may be possible for an authorized/registered user to remotely activate or deactivate SS-PC on behalf of the served user within the range of priority levels that have been provided.

###### **C.4.2.2.1.3 Definition**

As an implementation option, authorized/registered users may dynamically define the priority level or priority level range for each registered ITSI/GTSI. This process supplements the provision process, where the ITSI's shall be allocated a priority level range upon provision, and facilitates the "on line" change of priority level ranges.

###### **C.4.2.2.1.4 Registration**

As an implementation option authorized users, capable of defining and/or remotely activating or deactivating the priority level or priority level range, shall be registered with the applicable ITSI/GTSI range.

###### **C.4.2.2.1.5 Interrogation**

The infrastructure may provide interrogation, which can be local, remote or both.

If interrogation is provided, a TETRA network shall support interrogation on a per number basis, e.g.:

- provided or not provided;
- default priority level;
- priority level range;

- registered ITSI range.

#### **C.4.2.2.2 Invocation and operation**

The served user shall be able to invoke SS-PC as part of the initial call set up by sending the required priority level. The priority level may be dynamically assigned.

In the instance where there is no congestion across the network resources, the served user's call shall be set up in the normal manner.

When the network resources have become congested, the infrastructure shall compare the priority level of each call attempt and allocate the resources, when they become available, to the call attempt with the highest priority level.

SS-PC may also be provided on a GTSI basis. If the caller is a member of the group and he dials the GTSI then the appropriate priority level associated with the GTSI shall be used. If the caller is not a member of the group, one of his own priority levels shall be used.

If the served user does not select a priority level to be associated with the call, it shall be a network option as to which priority level shall be selected.

It is an operator option if the priority level can be changed within the network.

#### **C.4.2.3 Exceptional procedures**

##### **C.4.2.3.1 Activation, deactivation, registration, and interrogation**

###### **C.4.2.3.1.1 Activation and deactivation**

Exceptional procedures for activation and deactivation shall not be applicable to SS-PC.

###### **C.4.2.3.1.2 Remote activation and deactivation**

The remote activator may select a priority level which is not within the range of priority levels provided. A notification shall be returned to the remote activator.

###### **C.4.2.3.1.3 Definition**

If the system cannot accept a definition request, the authorised user shall receive a notification that SS-PC definition was not successful. Possible causes for rejection can be insufficient information.

###### **C.4.2.3.1.4 Registration**

If the system cannot accept a registration request, the service provider shall receive a notification that SS-PC registration was not successful. Possible causes for rejection can be Registered User Identification (ITSI) is not allowed.

###### **C.4.2.3.1.5 Interrogation**

If the TETRA network cannot accept an interrogation request, the interrogating user shall receive a notification that SS-PC interrogation was unsuccessful. Possible causes for rejection can be:

- service or option;
- insufficient information;
- basic service to which relevance is requested is not subscribed to;
- unauthorized user.

**C.4.2.3.2 Invocation and operation**

If the user attempts to make a call and invoke a priority level which is outside his normal range, the infrastructure shall automatically adjust the priority level to either the maximum or minimum value as appropriate and proceed with the call. A notification may be returned to the served user.

SS-PC shall be rejected by the TETRA if the served user does not have the appropriate profile to use the service.

If the infrastructure cannot invoke the service, the cause shall be returned to the subscriber.

**C.4.3 Interactions with other supplementary services**

Interactions with other TETRA supplementary services are specified in subclauses C.4.3.1 to C.4.3.30.

**C.4.3.1 Calling Line Identification Presentation (SS-CLIP)**

SS-PC shall not have any interaction with SS-CLIP.

**C.4.3.2 Connected Line Identification Presentation (SS-COLP)**

SS-PC shall not have any interaction with SS-COLP.

**C.4.3.3 Calling/Connected Line Identification Restriction (SS-CLIR)**

SS-PC shall not have any interaction with SS-CLIR.

**C.4.3.4 Call Report (SS-CR)**

SS-PC shall not have any interaction with SS-CR.

**C.4.3.5 Talking Party Identification (SS-TPI)**

SS-PC shall not have any interaction with SS-TPI.

**C.4.3.6 Call Forwarding Unconditional (SS-CFU)**

SS-PC shall not have any interaction with SS-CFU.

**C.4.3.7 Call Forwarding on mobile subscriber Busy (SS-CFB)**

SS-PC shall not have any interaction with SS-CFB.

**C.4.3.8 Call Forwarding on No Reply (SS-CFNRy)**

SS-PC shall not have any interaction with SS-CFNRy.

**C.4.3.9 Call Forwarding on mobile subscriber Not Reachable (SS-CFNRc)**

SS-PC shall not have any interaction with SS-CFNRc.

**C.4.3.10 List Search Call (SS-LSC)**

SS-PC shall not have any interaction with SS-LSC.

It shall be possible to invoke SS-LSC and SS-PC at the same time thereby assigning each call attempt with the invoked priority level.

**C.4.3.11 Call Authorized by Dispatcher (SS-CAD)**

SS-PC shall not have any interaction with SS-CAD.

**C.4.3.12 Short Number Addressing (SS-SNA)**

SS-PC shall not have any interaction with SS-SNA.

It shall be possible to invoke SS-SNA and SS-PC at the same time thereby assigning each call attempt a priority level.

**C.4.3.13 Area Selection (SS-AS)**

SS-PC shall not have any interaction with SS-AS.

**C.4.3.14 Access Priority (SS-AP)**

SS-PC shall not have any interaction with SS-AP.

**C.4.3.15 Priority Call (SS-PC)**

Not applicable.

**C.4.3.16 Call Waiting (SS-CW)**

SS-PC shall not have any interaction with SS-CW.

If the called user is engaged and the calling user has invoked this supplementary service then the priority level may be indicated to the called user in conjunction with the SS-CW indication.

**C.4.3.17 Call Hold (SS-HOLD)**

SS-PC shall not have any interaction with SS-HOLD.

**C.4.3.18 Call Completion to Busy Subscriber (SS-CCBS)**

SS-PC shall not have any interaction with SS-CCBS.

It shall be possible to invoke SS-CCBS and SS-PC at the same time thereby assigning each call attempt a priority level.

**C.4.3.19 Late Entry (SS-LE)**

SS-PC shall not have any interaction with SS-LE.

The SS-LE broadcast shall provide the priority level information of the group call to the terminal equipment and may be indicated to the called user.

**C.4.3.20 Transfer of Control (SS-TC)**

SS-PC shall not have any interaction with SS-TC.

The priority level assigned to the original call shall remain with the call, even though the originator may have transferred the control to another user within the existing call, and subsequently left.

**C.4.3.21 Pre-emptive Priority Call (SS-PPC)**

A SS-PPC shall always have precedence over a SS-PC and it shall take resources away from the priority call if required.

**C.4.3.22 Include Call (SS-IC)**

SS-PC shall not have any interaction with SS-IC.

**C.4.3.23 Advice of Charge (SS-AoC)**

SS-PC shall not have any interaction with SS-AoC.

**C.4.3.24 Barring of Outgoing Calls (SS-BOC)**

SS-PC shall not have any interaction with SS-BOC.

**C.4.3.25 Barring of Incoming Calls (SS-BIC)**

SS-PC shall not have any interaction with SS-BIC.

An incoming SS-PC shall not be offered to the barred user.

**C.4.3.26 Discreet Listening (SS-DL)**

SS-PC shall not have any interaction with SS-DL.

**C.4.3.27 Ambience Listening (SS-AL)**

SS-PC shall not have any interaction with SS-AL.

**C.4.3.28 Dynamic Group Number Assignment (SS-DGNA)**

SS-PC shall not have any interaction with SS-DGNA.

In accordance with SS-DGNA, the priority level assigned to the new group shall be downloaded to each concerned ITSI.

**C.4.3.29 Call Completion on No Reply (SS-CCNR)**

SS-PC shall not have any interaction with SS-CCNR.

It shall be possible to invoke this supplementary service and SS-PC at the same time thereby assigning each call attempt a priority level.

**C.4.3.30 Call Retention (SS-CRT)**

SS-PC shall not have any interaction with SS-CRT.

**C.4.4 Interworking considerations**

When the served user moves to another TETRA network, he shall be informed of the existence of or change to his priority level.



#### C.4.5 Overall SDL

Figure C.1 contains the dynamic description of SS-PC using the Specification Description Language (SDL) defined in ITU-T Recommendation Z.100 [1]. The SDL process represents the behaviour of the network in providing SS-PC.

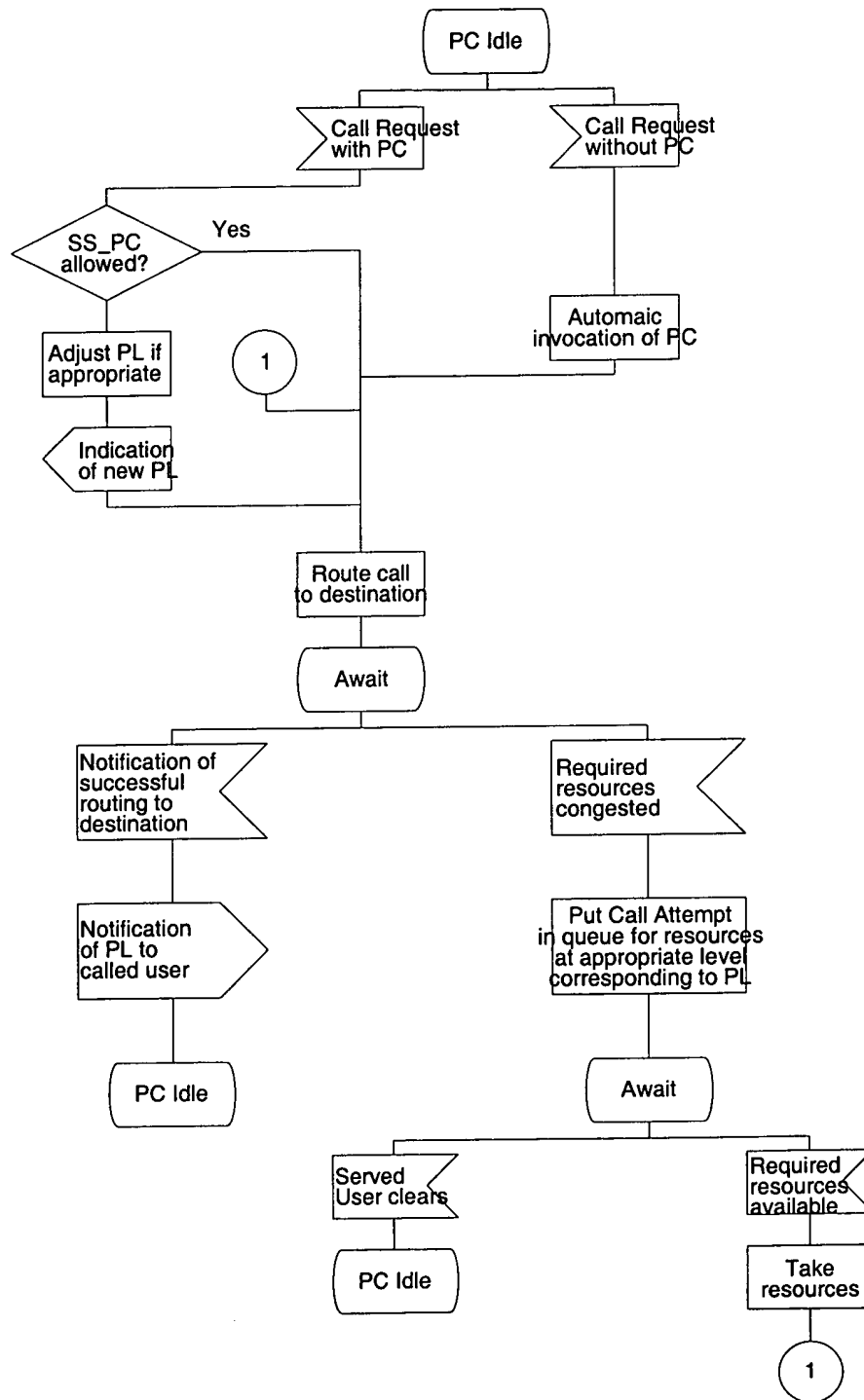


Figure C.1: SS-PC supplementary service, overall SDL

## **Annex D (informative): Supplementary Service stage 1: Pre-emptive Priority Call (SS-PPC) (TETRA 03.76)**

### **D.1 Scope**

This Interim European Telecommunication Standard (I-ETS) defines the stage 1 specifications of the Supplementary Service Pre-emptive Priority Call (SS-PPC) for the Trans-European Trunked Radio (TETRA). Stage 1 is an overall service description from the users point of view but does not deal with the details of the human interface itself.

This I-ETS specifies the service description of the supplementary service and the procedures to be expected with successful and unsuccessful outcomes. In addition this I-ETS specifies the interactions with other TETRA supplementary services and interworking considerations.

Charging principles shall be outside the scope of this I-ETS.

The SS-PPC enables a user to have preferential access to TETRA network resources including pre-emption of calls.

### **D.2 Normative references**

This I-ETS incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this I-ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ITU-T Recommendation I.221 (1993): "Common specific characteristics of services".
- [2] ITU-T Recommendation Z.100 (1993): "Specification and Description Language (SDL)".

### **D.3 Definitions and abbreviations (TETRA 01.04)**

#### **D.3.1 Definitions**

For the purposes of this I-ETS the following definitions apply:

**Access control:** the prevention of unauthorized use of resources, including the use of a resource in an unauthorized manner.

**Access Priority Level (APL):** a value allocated to each mobile ITS/GTS/Call type. It is used at the initial call set-up attempt to determine priority access across the air interface to the control functional entities.

**Broadcast call:** a multipoint call in which the same information is transmitted simultaneously by the calling terminal to all available terminals.

**Busy:** a property of a user for whom a network determined user busy or user determined user busy condition applies, (see ITU-T Recommendation I.221 [1]).

**Call Retention Value (CRV):** call retention priority is a network option which defines the relative level of protection of the established call against the probability of having the resources pre-empted. In the event of a pre-emption of resources the call with the lowest CRV should be taken. On networks which do not implement call retention, it is assumed that all calls have the same CRV.

**Established call:** the call between User B and C upon which the pre-emption request is made.

**Impending pre-emption warning indication:** a warning provided before a pre-emption of the call is established.

**Pre-emptive Priority Level (PPL):** a pre-agreed value allocated to each mobile ITSI/GTSI/Call type. It is used so that resources may be allocated to the SS-PPC.

**Pre-emptive state:** the call connection condition between the time the pre-emptive call is established by the network and the ending of the pre-emptive call, e.g. by the served user clearing.

**Priority Level (PL):** a pre-agreed value allocated to each mobile ITSI/GTSI/Call type. It is used to determine priority access to network resources in the event of network congestion.

**Served user:** the user A making the SS-PPC to user B.

**Time to pre-emption:** the selected time period between provision of warning of impending intrusion indication and establishment of the connection.

### D.3.2 Abbreviations

#### D.3.2.1 General abbreviations

For the purposes of this I-ETS the following general abbreviations apply:

GTSI	Group TETRA Subscriber Identity
ISDN	Integrated Services Digital Network
ISI	Inter System Interface
ITSI	Individual TETRA Subscriber Identity
LS	Line Station
PSTN	Public Switched Telephone Network
PTN	Private Telephone Network
SDL	(Functional) Specification and Description Language
SS	Supplementary Service

NOTE: The abbreviation SS is only used when referring to a specific supplementary service.

SwMI	Switching and Management Infrastructure
TETRA	Trans-European Trunked Radio

#### D.3.2.2 Supplementary service abbreviations

For the purposes of this I-ETS the following supplementary service abbreviations apply:

SS-AL	Ambience Listening
SS-AoC	Advice of Charge
SS-AP	Access Priority
SS-AS	Area Selection
SS-BIC	Barring of Incoming Calls
SS-BOC	Barring of Outgoing Calls
SS-CAD	Call Authorized by Dispatcher
SS-CCBS	Call Completion to Busy Subscriber
SS-CCNR	Call Completion on No Reply
SS-CFB	Call Forwarding on Busy
SS-CFNRy	Call Forwarding on No Reply
SS-CFNRc	Call Forwarding on Mobile Subscriber Not Reachable
SS-CFU	Call Forwarding Unconditional
SS-CLIP	Calling Line Identification Presentation
SS-CLIR	Calling/Connected Line Identification Restriction
SS-COLP	Connected Line Identification Presentation
SS-CR	Call Report
SS-CRT	Call Retention
SS-CW	Call Waiting
SS-DGNA	Dynamic Group Number Assignment
SS-DL	Discreet Listening
SS-HOLD	Call Hold
SS-IC	Include Call

SS-LE	Late Entry
SS-LSC	List Search Call
SS-PC	Priority Call
SS-PPC	Pre-emptive Priority Call
SS-SNA	Short Number Addressing
SS-TC	Transfer of Control
SS-TPI	Talking Party Identification

## **D.4 Supplementary Service Pre-emptive Priority Call (SS-PPC) Stage 1 specification**

### **D.4.1 Description**

#### **D.4.1.1 General description**

SS-PPC enables the user to have resources allocated, even if this means that other calls with lower priority shall be disconnected. SS-PPC normally means the highest Access Priority Level (APL) at uplink access and highest Priority Level (PL) across TETRA networks.

If the required resources are unavailable (i.e. occupied by other users), a call with pre-emptive priority shall automatically cause the oldest calls with the lowest Call Retention Value (CRV) using such resources to be disconnected. The pre-emptive priority call shall be given the released resources.

NOTE: It is possible that some networks may prefer a different process for determining resource priority.

In the event where the destination TETRA address is already engaged on an established call the pre-emptive priority call shall have the ability to interrupt and pre-empt the call at the destination address, unless the established call has a sufficiently high CRV that the incoming pre-emptive priority call cannot pre-empt.

The operator shall be required to provide a correspondence between pre-emptive priority values and CRV.

If the Pre-emptive Priority Level (PPL) is the same or less than the CRV of the established call, then pre-emption shall not take place.

Retrieving the called user from an individual call shall automatically force release of the established call.

Retrieving the called user from a group call shall depend upon whether the called user is the call owner of the group call. If the called user is the group call owner then the group call shall be force released upon pre-emption. If the called user is solely a participating member of the group then the group call shall not be force released, and the called user shall be removed from the ongoing group call.

In the case where there is no congestion across the air interface or the network resources and the called user is not engaged, the call shall be set up in the normal manner, but the call shall keep the call retention value of the pre-emptive priority call.

#### **D.4.1.2 Qualifications on applicability to telecommunication services**

This supplementary service shall be applicable to all individual and group TETRA teleservices and bearer services. It shall not be applicable to TETRA packet data services nor to the Short Data Service (SDS).

### **D.4.2 Procedures**

#### **D.4.2.1 Provision and withdrawal**

Provision and withdrawal of SS-PPC shall be by pre-arrangement with the service provider.

SS-PPC shall be on a per TETRA number (ITSI/GTSI) basis. For each ITSI/GTSI, the supplementary service may be subscribed to for every basic service subscribed to at that ITSI/GTSI, or for only some of the basic services subscribed to at that ITSI/GTSI.

The subscription parameters and values offered by a TETRA network shall be an implementation matter. A TETRA network may offer more or less parameters and values than those specified in table D.1.

**Table D.1: Subscription options**

Subscription parameter	Value
Immediate pre-emption required	Yes/No
Time to pre-emption (only required if answer to above is "No")	Seconds

**D.4.2.2 Normal procedures**

**D.4.2.2.1 Activation, deactivation, registration, and interrogation**

**D.4.2.2.1.1 Activation and deactivation**

SS-PPC shall be activated by the service provider upon provision and deactivated upon withdrawal.

**D.4.2.2.1.2 Registration**

Registration shall not be applicable to a SS-PPC.

**D.4.2.2.1.3 Interrogation**

The infrastructure may provide interrogation, which can be local, remote or both.

If local interrogation is provided, a TETRA network shall support interrogation on a per number basis for:

- all TETRA teleservices/bearer services as defined previously; and/or
- a user specified basic service.

The TETRA network response to an interrogation request shall provide the following information to the user:

- provided or not provided including subscription option.

Remote interrogation shall be possible by a special authorized user. The remote interrogation request and response shall include the information as specified for local interrogation and additionally the ITS/GTSI of the activating user.

**D.4.2.2.2 Invocation and operation**

The served user shall be able to invoke SS-PPC as part of the initial call set up.

The served user shall be assigned a traffic channel and network resources, regardless of the operating state of the TETRA network. Should no traffic channels be available at the initial call request, the oldest call with the lowest call retention value shall be released. If immediate pre-emption is not subscribed to, a warning indication shall be given, for a time period, to the connected parties to be pre-empted, after which the parties shall be cleared from the traffic channel and the traffic channel shall be given to the pre-emptive priority call. The warning indication shall act as an indication to the connected parties to terminate the call. The time given to the connected parties before pre-emption occurs shall be a subscription option.

If immediate pre-emption is subscribed to, then the connected parties to be released shall be given the reason for release as part of normal call control procedures.

In the instance where all traffic channels are occupied by pre-emptive priority calls, then the network shall check the Call Retention Value (CRV) of each of the calls, and, if appropriate, the oldest call with the lowest value shall be released and the new call connected.

In the instance where there is no congestion across the air interface or the network resources and the called user is not engaged, the call shall be set up in the normal manner, but the call shall keep the CRV of the pre-emptive priority call.

#### **D.4.2.2.1 Pre-empting individual call**

In the case where the called user is engaged on an individual call, the CRV of the existing call shall be checked by the infrastructure. If the incoming pre-emptive priority call cannot pre-empt because the established call has a sufficiently high CRV, then the served user shall be informed of the rejection of the invocation and the reason shall be provided.

If the CRV of the existing call is low and it is possible to pre-empt, then the users in the established call shall be notified of an impending pre-emptive priority call. In this case, a special notification may be provided to all of the users involved in the pre-emptive priority call i.e. "Impending pre-emption warning indication".

The impending pre-emption warning indication shall act as a notification to the established users to terminate the established call. For the served user, the indication shall act as a notification that an existing call exists at the called user and pre-emption has been instigated.

A selected time period, "time to pre-emption" (e.g. 0 to 10 seconds), after the impending pre-emption warning indication has been given, a connection shall be set up between the served user and the called user B. The user C shall be cleared.

NOTE: If immediate pre-emption is required, no impending pre-emption warning indication is given.

#### **D.4.2.2.2 Pre-empting group call**

In the case where the called user is engaged on a group call, the CRV of the existing call shall be checked by the infrastructure. If the incoming pre-emptive priority call cannot pre-empt because of a high CRV, then the served user shall be informed of the rejection of the invocation and the reason shall be provided.

If the CRV of the existing group call is low and it is possible to pre-empt, then the called user in the established call shall be notified of an impending pre-emptive priority call.

The impending pre-emption warning indication shall act as a notification to the called user to give him an opportunity to inform others of his pre-emption. For the served user, the indication shall act as a notification that an existing call exists at the called user and pre-emption has been instigated.

A new traffic channel shall be assigned, or taken from an established call with the lowest Call Retention Value (CRV), for the pre-emptive priority call and after a selected time period, "time to pre-emption" (e.g. 0 to 10 seconds), the called user shall be transferred to this new channel. If the called user is not the call owner the group call shall be isolated from the called user within the infrastructure, and the participants shall be able to continue with the call without interruption.

If the called user is the group call owner, then the group call shall be force released.

NOTE 1: In order to prevent this the called user may invoke the Supplementary Service Transfer of Control (SS-TC) or Supplementary Service Call Hold (SS-HOLD) so that the group call may continue.

NOTE 2: If immediate pre-emption is required no impending pre-emption warning indication is given.

When the pre-emptive priority call has been terminated the called user shall return to idle, (unless the ongoing group call has been put on hold, in which case the called user may return to the group call).

#### **D.4.2.3 Exceptional procedures**

##### **D.4.2.3.1 Activation, deactivation, registration, and interrogation**

###### **D.4.2.3.1.1 Activation and deactivation**

Exceptional procedures for activation and deactivation shall not apply to SS-PPC.

###### **D.4.2.3.1.2 Registration**

Exceptional procedures for registration shall not apply to SS-PPC.

###### **D.4.2.3.1.3 Interrogation**

If the TETRA network cannot accept an interrogation request, the interrogating user shall receive a notification that SS-PPC interrogation was unsuccessful. Possible causes for rejection can be e.g.:

- supplementary service not subscribed to;
- insufficient information;
- basic service to which relevance is requested, is not subscribed to;
- unauthorized user.

###### **D.4.2.3.2 Invocation and operation**

Invocation and operation of SS-PPC shall be rejected by TETRA if:

- the served user does not have the appropriate profile to use the service;
- all traffic channels are occupied by pre-emptive priority calls with high CRVs which protect against pre-emption.

If the infrastructure cannot invoke the service, the cause shall be returned to the subscriber.

#### **D.4.3 Interactions with other supplementary services**

Interactions with other TETRA supplementary services are specified below.

##### **D.4.3.1 Calling Line Identification Presentation (SS-CLIP)**

SS-PPC shall not have any interaction with SS-CLIP.

##### **D.4.3.2 Connected Line identification Presentation (SS-COLP)**

SS-PPC shall not have any interaction with SS-COLP.

##### **D.4.3.3 Calling/Connected Line Identification Restriction (SS-CLIR)**

SS-PPC shall not have any interaction with SS-CLIR.

##### **D.4.3.4 Call Report (SS-CR)**

SS-PPC shall not have any interaction with SS-CR.

Neither supplementary service shall affect the operation of the other supplementary service.

##### **D.4.3.5 Talking Party Identification (SS-TPI)**

SS-PPC shall not have any interaction with SS-TPI.

Neither supplementary service shall affect the operation of the other supplementary service.

**D.4.3.6 Call Forwarding Unconditional (SS-CFU)**

SS-PPC shall not have any interaction with SS-CFU and the served user shall be connected to the diverted-to party.

**D.4.3.7 Call Forwarding on mobile subscriber Busy (SS-CFB)**

SS-PPC shall take precedence over SS-CFB and the served user shall be connected directly with the called user.

**D.4.3.8 Call Forwarding on No Reply (SS-CFNRy)**

SS-PPC shall not have any interaction with SS-CFNRy.

Neither supplementary service shall affect the operation of the other supplementary service. A pre-emptive priority call shall be forwarded if there is no reply from the called user.

**D.4.3.9 Call Forwarding on mobile subscriber Not Reachable (SS-CFNRc)**

SS-PPC shall not have any interaction with SS-CFNRc.

Neither supplementary service shall affect the operation of the other supplementary service. A pre-emptive priority call shall be forwarded if the called MS is not reachable.

**D.4.3.10 List Search Call (SS-LSC)**

SS-PPC shall not have any interaction with SS-LSC.

Neither supplementary service shall affect the operation of the other supplementary service.

**D.4.3.11 Call Authorized by Dispatcher (SS-CAD)**

The SS-PPC takes precedence over SS-CAD and the pre-emptive priority call shall proceed to completion without the necessity of seeking approval from the dispatcher. The dispatcher should normally receive a notification that the served user had made a pre-emptive priority call.

**D.4.3.12 Short Number Addressing (SS-SNA)**

SS-PPC shall not have any interaction with SS-SNA.

Neither supplementary service shall affect the operation of the other supplementary service.

**D.4.3.13 Area Selection (SS-AS)**

SS-PPC shall not have any interaction with SS-AS.

Neither supplementary service shall affect the operation of the other supplementary service.

**D.4.3.14 Access Priority (SS-AP)**

SS-PPC shall not have any interaction with SS-AP.

A SS-PPC has the highest APL.

**D.4.3.15 Priority Call (SS-PC)**

A SS-PPC shall always take precedence over a SS-PC.



**D.4.3.16 Call Waiting (SS-CW)**

If the established call can be pre-empted then pre-emptive priority call shall take precedence and SS-CW shall not be invoked. If however the established call has a sufficiently high Call Retention Value (CRV) that it cannot be pre-empted, then SS-CW shall be invoked.

**D.4.3.17 Call Hold (SS-HOLD)**

If SS-HOLD is subscribed to by the served user there shall not be any interaction between SS-HOLD and SS-PPC. Neither supplementary service shall affect the operation of the other supplementary service.

If SS-HOLD is subscribed to by the user B then user B shall not be able to invoke the SS-HOLD whilst the pre-emption state applies.

It shall not be possible to force release a call being held by user B. User B may return to this call upon termination of the pre-emptive priority call.

If user B is actively on hold, it shall be possible for the served user to pre-empt on user B and force release the connection to user C.

**D.4.3.18 Call Completion on Busy Subscriber (SS-CCBS)**

SS-PPC shall not have any interaction with SS-CCBS.

It shall be possible to invoke this supplementary service if the served user has been unable to make a connection with user B, due to the resources/called user required having a sufficiently high CRV to protect against pre-emptive priority calls.

**D.4.3.19 Late Entry (SS-LE)**

SS-PPC shall not have any interaction with SS-LE.

Neither supplementary service shall affect the operation of the other supplementary service.

**D.4.3.20 Transfer of Control (SS-TC)**

SS-PPC shall not have any interaction with SS-TC.

It shall be possible for user B to transfer control of an ongoing group call as a result of an indication of an impending SS-PPC.

It shall be possible for the served user to transfer the control of a pre-emptive priority call to another user.

**D.4.3.21 Pre-emptive Priority Call (SS-PPC)**

If SS-PPC is invoked by the called user before the served user is connected to the called user, then the Call Retention Value (CRV) of the established call shall be checked against the pre-emptive priority level of the served user.

**D.4.3.22 Include Call (SS-IC)**

SS-PPC shall not have any interaction with SS-IC.

It shall be possible for the served user to include another user into the pre-emptive priority call.

It shall be possible for the called user to include another user into the pre-emptive priority call.

**D.4.3.23 Advice of Charge (SS-AoC)**

SS-PPC shall not have any interaction with SS-AoC.

**D.4.3.24     Barring of Outgoing Calls (SS-BOC)**

SS-PPC shall not have any interaction with SS-BOC.

Pre-emptive priority calls may also be barred.

**D.4.3.25     Barring of Incoming Calls (SS-BIC)**

SS-PPC shall not have any interaction with SS-BIC.

A pre-emptive priority call shall not be offered to the barred user.

**D.4.3.26     Discreet Listening (SS-DL)**

SS-PPC shall not have any interaction with SS-DL.

A pre-emptive priority call to the dispatcher whilst the dispatcher is engaged on a SS-DL, shall override the SS-DL call and force release after the "Time to Pre-emption" period.

NOTE:     It should be for the "dispatcher" to ensure that ITSI's used for SS-DL calls are not generally available for incoming calls.

**D.4.3.27     Ambience Listening (SS-AL)**

SS-PPC shall not have any interaction with SS-AL.

A pre-emptive priority call to the dispatcher whilst the dispatcher is engaged on an SS-AL call shall ensure that the impending pre-emption warning indication shall only be given to the dispatcher.

NOTE:     It should be for the "dispatcher" to ensure that ITSI's used for SS-AL calls are not generally available for incoming calls.

**D.4.3.28     Dynamic Group Number Assignment (SS-DGNA)**

SS-PPC shall not have any interaction with dynamic group number assignment.

Neither supplementary service shall affect the operation of the other supplementary service.

**D.4.3.29     Call Completion on No Reply (SS-CCNR)**

SS-PPC shall not have any interaction with SS-CCNR.

Neither supplementary service shall affect the operation of the other supplementary service.

**D.4.3.30     Call Retention (SS-CRT)**

If the calling user has invoked SS-PPC and SS-CRT at the same time , there shall be no interaction.

If the calling user has invoked SS-PPC and the called user is engaged on a call, and SS-CRT has been invoked for that call then the CRV shall be checked before the call can be pre-empted under normal procedures of the supplementary services. If the CRV is sufficiently high, the SS-PPC shall not be able to pre-empt the ongoing call.

**D.4.4     Interworking considerations**

When the user C belongs to another network, indications to the user C shall be sent to user C's network for forwarding to the user C.

The served user shall not be able to pre-empt the called user, if the called user is not a TETRA subscriber.

#### D.4.5 Overall SDL

Figure D.1 contains the dynamic description of SS-PPC using the Specification Description Language (SDL) defined in ITU-T Recommendation Z.100 [2]. The SDL process represents the behaviour of the network in providing SS-PPC.

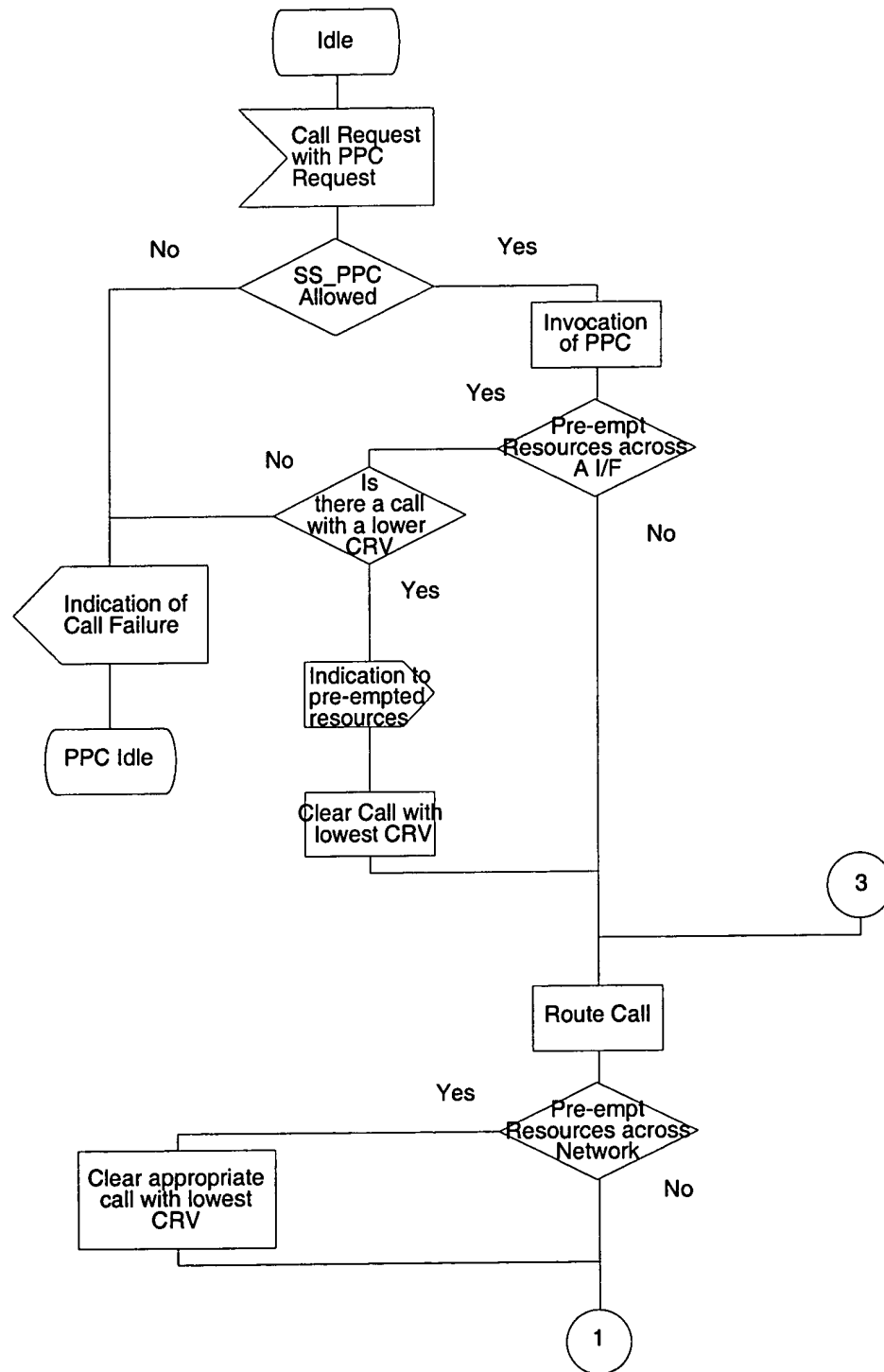


Figure D.1 (sheet 1 of 3): SS-PPC supplementary service, overall SDL

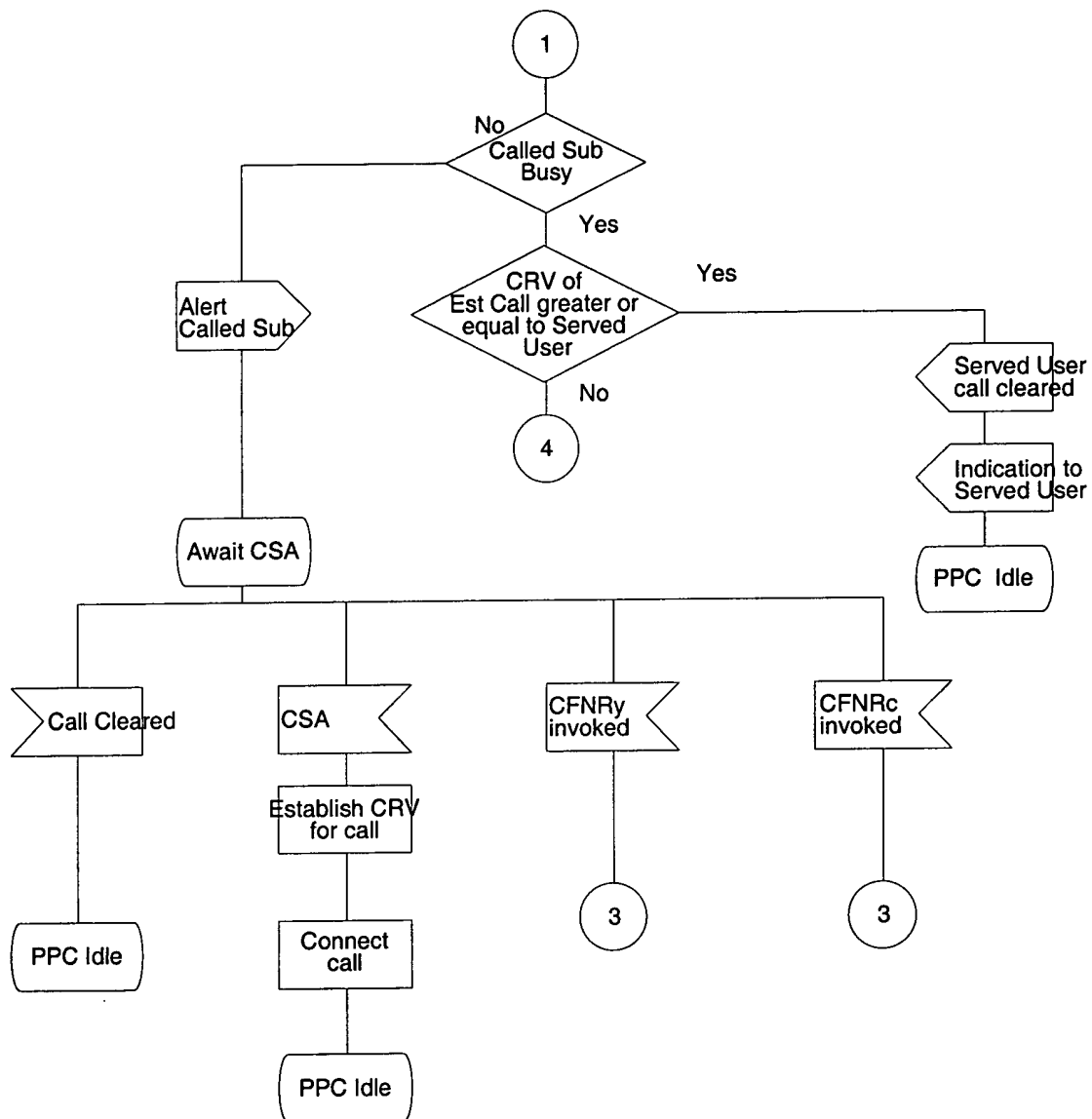


Figure D.1 (sheet 2 of 3): SS-PPC supplementary service, overall SDL

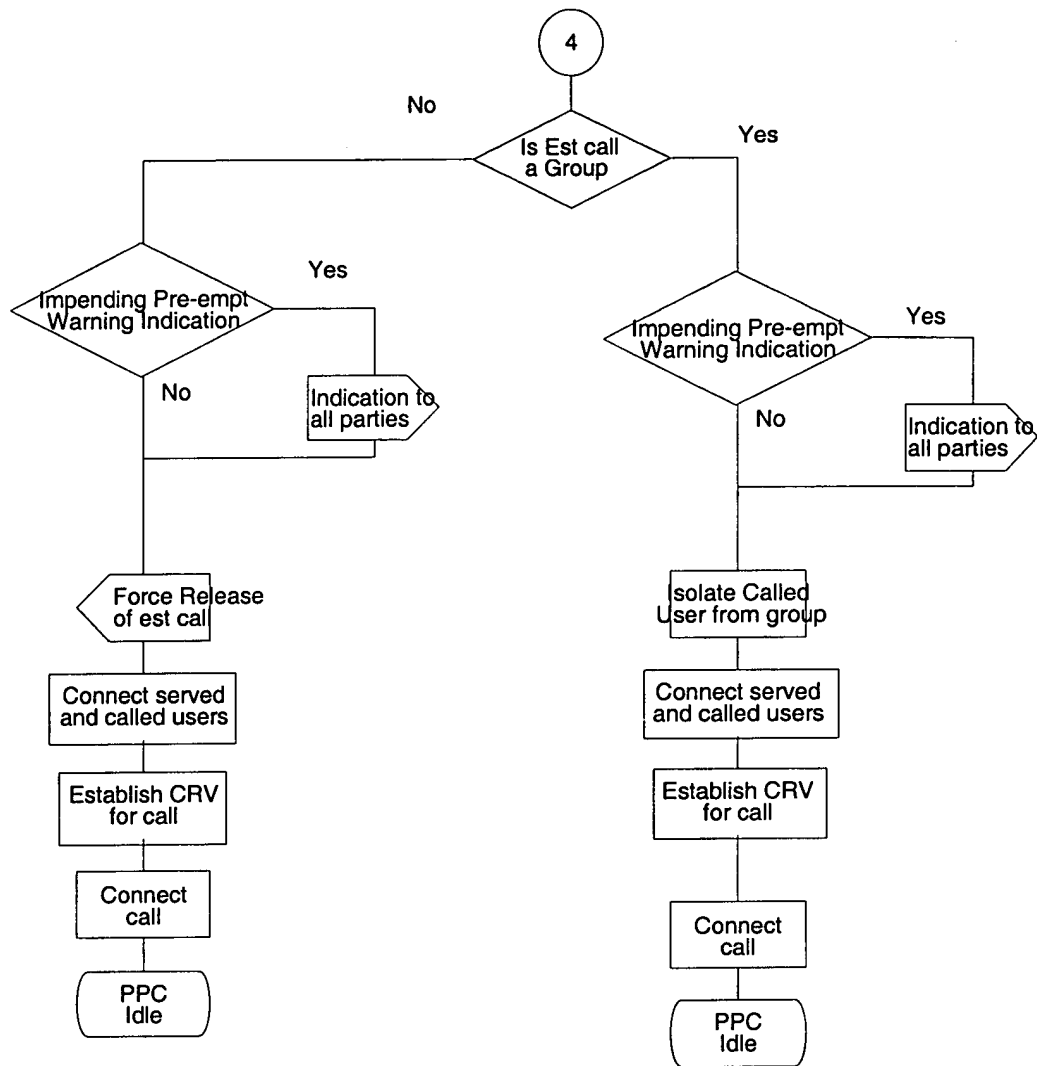


Figure D.1 (sheet 3 of 3): SS-PPC supplementary service, overall SDL

## **Annex E (informative): Supplementary Service stage 1: Call Retention (SS-CRT) (TETRA 03.85)**

### **E.1 Scope**

This draft Interim Telecommunication Standard (I-ETS) defines the stage 1 specifications of the Supplementary Service Call Retention (SS-CRT) for the Trans-European Trunked Radio (TETRA). Stage 1 is an overall service description from the users point of view but does not deal with the details of the human interface itself.

This I-ETS specifies the service description of the supplementary service and the procedures to be expected with successful and unsuccessful outcomes. In addition this I-ETS specifies the interactions with other TETRA supplementary services and interworking considerations.

Charging principles shall be outside the scope of this I-ETS.

The SS-CRT enables a served user to protect his established calls against pre-emption.

### **E.2 Normative references**

This I-ETS incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this I-ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ITU-T Recommendation Z.100 (1993): "Specification and Description Language (SDL)".

### **E.3 Definitions and abbreviations**

#### **E.3.1 Definitions (TETRA 01.04)**

For the purposes of this I-ETS the following definitions apply:

**Call Retention Value (CRV):** SS-CRT priority is a service which defines the relative level of protection of the established call against the probability of having the resources pre-empted. In the event of a pre-emption of resources the call with the lowest CRV should be taken. On networks which do not implement SS-CRT, it is assumed that all calls have the same CRV.

**Served user:** the user wishing to protect his calls from pre-emption.

#### **E.3.2 Abbreviations (TETRA 01.04)**

##### **E.3.2.1 General abbreviations**

For the purposes of this I-ETS the following general abbreviations apply:

C/R	Challenge-Response pair
GTSI	Group TETRA Subscriber Identity
ISDN	Integrated Services Digital Network
ISI	Inter System Interface
ITSI	Individual TETRA Subscriber Identity
LS	Line Station
PSTN	Public Switched Telephone Network
PTN	Private Telephone Network
SDL	(Functional) Specification and Description Language
SS	Supplementary Service

**NOTE:** The abbreviation SS is only used when referring to a specific supplementary service.

SwMI                      Switching and Management Infrastructure  
TETRA                    Trans-European Trunked Radio

#### **E.3.2.2      Supplementary service abbreviations**

For the purposes of this I-ETS the following supplementary service abbreviations apply:

AL	Ambience Listening
AoC	Advice of Charge
AP	Access Priority
AS	Area Selection
BIC	Barring of Incoming Calls
BOC	Barring of Outgoing Calls
CAD	Call Authorized by Dispatcher
CCBS	Call Completion to Busy Subscriber
CCNR	Call Completion on No Reply
CFB	Call Forwarding on Busy
CFNRy	Call Forwarding on No Reply
CFNRc	Call Forwarding on Mobile Subscriber Not Reachable
CFU	Call Forwarding Unconditional
CLIP	Calling Line Identification Presentation
CLIR	Calling/Connected Line Identification Restriction
COLP	Connected Line Identification Presentation
CR	Call Report
CRT	Call Retention
CRV	Call Retention Value
CW	Call Waiting
DGNA	Dynamic Group Number Assignment
DL	Discreet Listening
HOLD	Call Hold
IC	Include Call
LE	Late Entry
LSC	List Search Call
PC	Priority Call
PPC	Pre-emptive Priority Call
SNA	Short Number Addressing
TC	Transfer of Control
TPI	Talking Party Identification

### **E.4      Supplementary Service Call Retention (SS-CRT) stage 1 specification**

#### **E.4.1      Description**

##### **E.4.1.1      General description**

SS-CRT enables the user to define a relative level of protection of his call, (once established), against the probability of having the network connection resources pre-empted.

It is envisaged that every call in a TETRA network shall be assigned a Call Retention Value (CRV), and, in the event that resources are required, the call with the lowest CRV, using the required resources, shall be pre-empted. Pre-emption of resources may be necessary because the resources are required by pre-emptive priority calls. In the event where all calls have the same CRV, another mechanism may be used to determine which resource to take e.g. oldest, type of call, user.

The user shall be able to use this supplementary service to enhance the CRV of his calls in order to protect against pre-emption.

The home network operator shall be required to provide a correspondence between priority values and CRVs.

#### **E.4.1.2 Qualifications on applicability to telecommunication services**

This supplementary service shall be applicable to all TETRA circuit mode teleservices and bearer services.

#### **E.4.2 Procedures**

##### **E.4.2.1 Provision and withdrawal**

Provision and withdrawal of SS-CRT shall be by pre-arrangement with the service provider or shall be generally available.

The provision of the service shall be on a per TETRA ITSI basis. For each ITSI, the supplementary service may be subscribed to for every basic service subscribed to at that ITSI/GTSI or for only some of the basic services subscribed to at that ITSI.

A user may be provided with a range of CRVs within which he may select on a per call basis.

NOTE: In the case of GTSIs, each member of the group may be downloaded with the associated CRV or CRV range at the same time as being downloaded with the GTSI.

##### **E.4.2.2 Normal procedures**

###### **E.4.2.2.1 Activation, deactivation, definition, registration, interrogation and cancellation**

###### **E.4.2.2.1.1 Activation and deactivation**

SS-CRT shall be activated by the service provider upon provision and deactivated upon withdrawal.

If the supplementary service is made generally available, then the served user shall be able to activate and invoke the service within the call set-up message.

###### **E.4.2.2.1.2 Remote activation and deactivation**

As an implementation option it may be possible for an authorized/registered user to remotely activate and deactivate SS-CRT on behalf of the served user within the range of CRVs that have been provided.

###### **E.4.2.2.1.3 Definition**

As an implementation option, authorized/registered users may dynamically define the Call Retention Value (CRV) or CRV range for each registered ITSI/GTSI.

NOTE: This process supplements the provision process, where the ITSIs are allocated a CRV range upon provision, and facilitates the "on line" change of CRV ranges.

The user shall not be able to change the CRV after the call has been set up.

###### **E.4.2.2.1.4 Registration**

As an implementation option authorized users, capable of defining and/or remotely activating or deactivating the CRV or CRV range, shall be registered with the applicable ITSI/GTSI range.

###### **E.4.2.2.1.5 Interrogation**

The infrastructure may provide interrogation, which can be local, remote or both.

If interrogation is provided, a TETRA network shall support interrogation on a per number basis for:

- provided/not provided;
- default CRV;



- SS-CRT value range;
- applicable basic service.

#### **E.4.2.2.1.6 Cancellation**

Cancellation shall not be applicable to SS-CRT.

#### **E.4.2.2.2 Invocation and operation**

The supplementary service shall be invoked automatically by the infrastructure as a result of the served user making a call. Unless otherwise instructed, the Call Retention Value (CRV) shall correspond to the default CRV of the basic service, pre-assigned upon provision.

Alternatively, the served user may wish to dynamically assign a CRV for the call, and this shall be sent in the initial call set up message.

If the service has been made generally available then the served user, shall be able to activate and invoke SS-CRT as part of the initial call set up, and shall send the required CRV value for the call.

SS-CRT may also be provided on a GTSI basis. If the caller is a member of the group and he dials the GTSI then the appropriate CRV associated with the GTSI shall be used. If the caller is not a member of the group, one of his own CRVs shall be used.

#### **E.4.2.3 Exceptional procedures**

##### **E.4.2.3.1 Activation, deactivation, registration, and interrogation**

###### **E.4.2.3.1.1 Activation and deactivation**

Exceptional procedures for activation and deactivation shall not be applicable to SS-CRT.

###### **E.4.2.3.1.2 Remote activation and deactivation**

The remote activator may select a CRV which is not within the range of CRVs provided. The service shall not be activated and a notification shall be returned to the remote activator.

###### **E.4.2.3.1.3 Definition**

The authorized user may attempt to select a larger range than allowed. A notification shall be returned to the authorized user.

###### **E.4.2.3.1.4 Registration**

Exceptional procedures for registration shall not be applicable to SS-CRT.

###### **E.4.2.3.1.5 Interrogation**

If the TETRA network cannot accept an interrogation request, the interrogating user shall receive a notification that SS-CRT interrogation was unsuccessful. Possible causes for rejection can be e.g.:

- supplementary service not subscribed to;
- insufficient information;
- basic service to which relevance is requested is not subscribed to;
- unauthorized user.

**E.4.2.3.2 Invocation and operation**

If the user attempts to make a call and establish a CRV which is outside his normal range, the infrastructure shall automatically adjust the CRV to either the maximum or minimum nearest value as appropriate for the served user and proceed with the call. A notification may be returned to the served user.

SS-CRT shall be rejected by the TETRA if the served user does not have the appropriate profile to use the service.

If the infrastructure cannot invoke the service, the cause shall be returned to the subscriber. Nevertheless the call may be allowed to proceed.

**E.4.2.3.2.1 Cancellation**

Cancellation is not applicable to SS-CRT.

**E.4.3 Interactions with other supplementary services**

Interactions with other TETRA supplementary services are specified below.

**E.4.3.1 Calling Line Identification Presentation (SS-CLIP)**

SS-CRT shall not have any interaction with SS-CLIP.

**E.4.3.2 Connected Line Identification Presentation (SS-COLP)**

SS-CRT shall not have any interaction with SS-COLP.

**E.4.3.3 Calling/Connected Line Identification Restriction (SS-CLIR)**

SS-CRT shall not have any interaction with SS-CLIR.

**E.4.3.4 Call Report (SS-CR)**

SS-CRT shall not have any interaction with SS-CR.

**E.4.3.5 Talking Party Identification (SS-TPI)**

SS-CRT shall not have any interaction with SS-TPI.

**E.4.3.6 Call Forwarding Unconditional (SS-CFU)**

SS-CRT shall not have any interaction with SS-CFU.

**E.4.3.7 Call Forwarding on mobile subscriber Busy (SS-CFB)**

SS-CRT shall not have any interaction with SS-CFB.

**E.4.3.8 Call Forwarding on No Reply (SS-CFNRy)**

SS-CRT shall not have any interaction with SS-CFNRy.

**E.4.3.9 Call Forwarding on mobile subscriber Not Reachable (SS-CFNRc)**

SS-CRT shall not have any interaction with SS-CFNRc.

**E.4.3.10 List Search Call (SS-LSC)**

SS-CRT shall not have any interaction with SS-LSC.

**E.4.3.11 Call Authorized by Dispatcher (SS-CAD)**

SS-CRT shall not have any interaction with SS-CAD.

**E.4.3.12 Short Number Addressing (SS-SNA)**

SS-CRT shall not have any interaction with SS-SNA.

**E.4.3.13 Area Selection (SS-AS)**

SS-CRT shall not have any interaction with SS-AS.

**E.4.3.14 Access Priority (SS-AP)**

SS-CRT shall not have any interaction with SS-AP.

**E.4.3.15 Priority Call (SS-PC)**

SS-CRT shall not have any interaction with SS-PC.

**E.4.3.16 Call Waiting (SS-CW)**

SS-CRT shall not have any interaction with SS-CW.

**E.4.3.17 Call Hold (SS-HOLD)**

SS-CRT shall not have any interaction with SS-HOLD.

**E.4.3.18 Call Completion to Busy Subscriber (SS-CCBS)**

SS-CRT shall not have any interaction with SS-CCBS.

**E.4.3.19 Late Entry (SS-LE)**

SS-CRT shall not have any interaction with SS-LE.

**E.4.3.20 Transfer of Control (SS-TC)**

SS-CRT shall not have any interaction with SS-TC.

**E.4.3.21 Pre-emptive Priority Call (SS-PPC)**

SS-CRT shall not have any interaction with SS-PPC.

**E.4.3.22 Include Call (SS-IC)**

SS-CRT shall not have any interaction with SS-IC.

**E.4.3.23 Advice of Charge (SS-AoC)**

SS-CRT shall not have any interaction with SS-AoC.

**E.4.3.24 Barring of Outgoing Calls (SS-BOC)**

SS-CRT shall not have any interaction with SS-BOC.

**E.4.3.25 Barring of Incoming Calls (SS-BIC)**

SS-CRT shall not have any interaction with SS-BIC.

**E.4.3.26 Discreet Listening (SS-DL)**

SS-CRT shall not have any interaction with SS-DL.

**E.4.3.27 Ambience Listening (SS-AL)**

SS-CRT shall not have any interaction with SS-AL.

**E.4.3.28 Dynamic Group Number Assignment (SS-DGNA)**

SS-CRT shall not have any interaction with SS-DGNA.

If the served user has dynamically assigned a new group then the CRV from the served user shall be downloaded to the members of the new group.

**E.4.3.29 Call Completion on No Reply (SS-CCNR)**

SS-CRT shall not have any interaction with SS-CCNR.

**E.4.3.30 Call Retention (SS-CRT)**

If the calling user has invoked SS-PPC and SS-CRT at the same time there shall be no interaction.

If the calling user has invoked SS-PPC and the user is engaged on a call and SS-CRT has been invoked for that call then the CRV shall be checked before the call can be pre-empted under normal procedures of the supplementary services. If the CRV is sufficiently high, The pre-emptive priority call may not be able to pre-empt the ongoing call.

**E.4.4 Interworking considerations**

When the served user moves to another TETRA network, he shall be informed of the existence of or change to his CRV.

#### E.4.5 Overall SDL

Figure E.1 contains the dynamic description of SS-CRT using the Specification Description Language (SDL) defined in ITU-T Recommendation Z.100 [1]. The SDL process represents the behaviour of the network in providing SS-CRT.

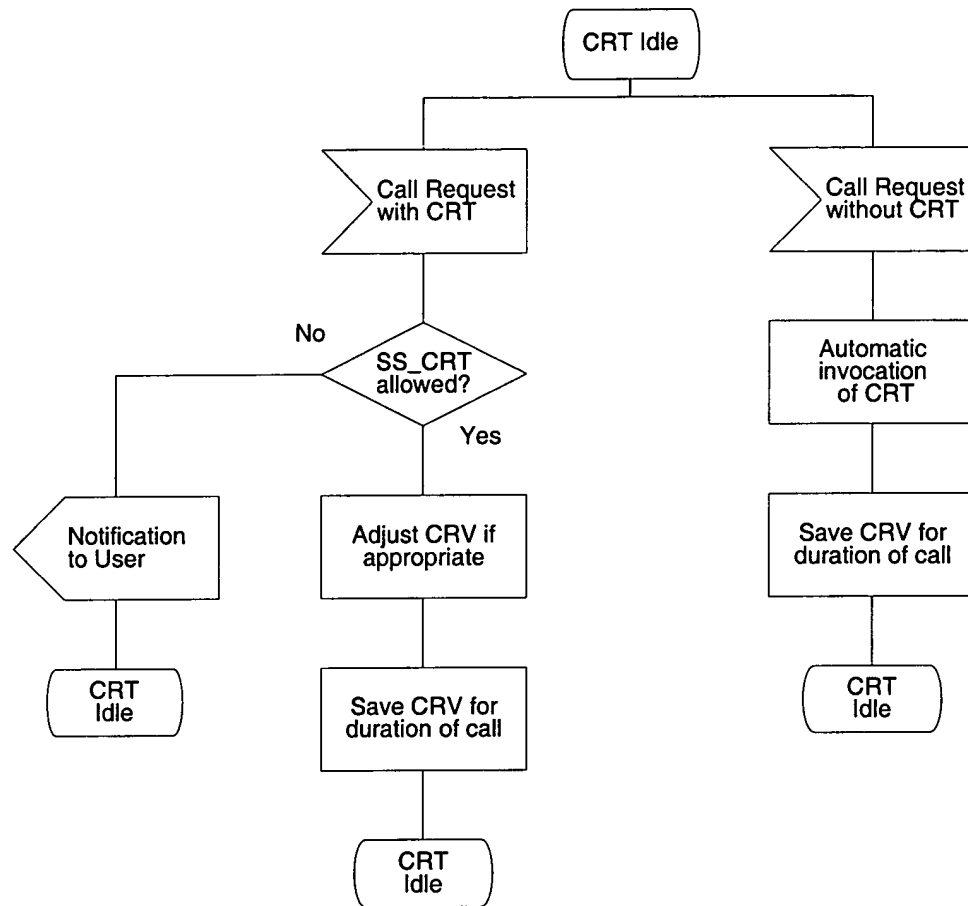


Figure E.1: SS-CRT supplementary service, overall SDL

## **Annex F (informative):     Supplementary Service stage 1: Call Authorized by Dispatcher (SS-CAD) (TETRA 03.66)**

### **F.1     Scope**

This draft Interim European Telecommunication Standard (I-ETS) defines the stage 1 specifications of the Supplementary Service Call Authorized by Dispatcher (SS-CAD) for the Trans-European Trunked Radio System (TETRA). Stage 1 is an overall service description from the users point of view but does not deal with the details of the human interface itself.

This I-ETS specifies the service description of the supplementary service and the procedures to be expected with successful and unsuccessful outcomes. In addition this I-ETS specifies the interactions with other TETRA supplementary services and interworking considerations.

Charging principles shall be outside the scope of this I-ETS.

The SS-CAD ensures that predefined TETRA calls shall not proceed without first being authorized by a dispatcher.

### **F.2     Normative references**

This I-ETS incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this I-ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1]                             ITU-T Recommendation Z.100 (1993): "Specification and Description Language (SDL)".

### **F.3     Definitions and abbreviations (TETRA 01.04)**

#### **F.3.1     Definitions**

For the purposes of this I-ETS the following definitions apply:

**Broadcast call:** a multipoint call in which the same information is transmitted simultaneously by the calling terminal to all available terminals.

**Outgoing call:** a call which, from the viewpoint of an individual participant in the call, is initiated by that participant.

**Restricted user:** the user (individual TETRA user or a user via a gateway) who is required to seek authorization from the dispatcher before the request for service can proceed.

**Served user:** the user or a group of users, to whom the request for authorization shall be directed to. It is normal that the served user is also the dispatcher that is responsible for that call.

#### **F.3.2     Abbreviations**

##### **F.3.2.1     General abbreviations**

For the purposes of this I-ETS the following general abbreviations apply:

GTSI	Group TETRA Subscriber Identity
ISDN	Integrated Services Digital Network
ISI	Inter System Interface
ITSI	Individual TETRA Subscriber Identity
LS	Line Station
PSTN	Public Switched Telephone Network
PTN	Private Telephone Network

SDL (Functional) Specification and Description Language  
SS Supplementary Service

NOTE: The abbreviation SS is only used when referring to a specific supplementary service.

SwMI Switching and Management Infrastructure  
TETRA Trans-European Trunked Radio  
V+D Voice Plus Data

#### **F.3.2.2 Supplementary service abbreviations**

For the purposes of this I-ETS the following supplementary service abbreviations apply:

SS-AL	Ambience Listening
SS-AoC	Advice of Charge
SS-AP	Access Priority
SS-AS	Area Selection
SS-BIC	Barring of Incoming Calls
SS-BOC	Barring of Outgoing Calls
SS-CAD	Call Authorized by Dispatcher
SS-CCBS	Call Completion to Busy Subscriber
SS-CCNR	Call Completion on No Reply
SS-CFB	Call Forwarding on Busy
SS-CFNRy	Call Forwarding on No Reply
SS-CFNRc	Call Forwarding on Mobile Subscriber Not Reachable
SS-CFU	Call Forwarding Unconditional
SS-CLIP	Calling Line Identification Presentation
SS-CLIR	Calling/Connected Line Identification Restriction
SS-COLP	Connected Line Identification Presentation
SS-CR	Call Report
SS-CRT	Call Retention
SS-CW	Call Waiting
SS-DGNA	Dynamic Group Number Assignment
SS-DL	Discreet Listening
SS-HOLD	Call Hold
SS-IC	Include Call
SS-LE	Late Entry
SS-LSC	List Search Call
SS-PC	Priority Call
SS-PPC	Pre-emptive Priority Call
SS-SNA	Short Number Addressing
SS-TC	Transfer of Control
SS-TPI	Talking Party Identification

### **F.4 Supplementary Service Call Authorized by Dispatcher (SS-CAD) Stage 1 specification**

#### **F.4.1 Description**

##### **F.4.1.1 General description**

SS-CAD is defined as the ability of the dispatcher to verify and approve a call request before the call is allowed to proceed.

The supplementary service shall also apply to the option whereby the dispatcher authorization of incoming call requests to specified TETRA addresses is required before the service can proceed. The specified TETRA addresses may be TETRA users or gateways. The incoming calls may be generated inside or outside of the operator's TETRA domain.

The service shall enable immediate interception of calls due to the following conditions:

- 1) category of calling user;

- 2) restricted basic service request;
- 3) restricted destination or source address;
- 4) restricted area.

#### F.4.1.2 Qualifications on applicability to telecommunication services

SS-CAD shall be applicable to all TETRA circuit mode teleservices and bearer services. (SS-CAD shall not be applicable to Short Data Service (SDS)).

#### F.4.2 Procedures

##### F.4.2.1 Provision and withdrawal

The SS-CAD supplementary service shall be provided by prior arrangement with the service provider.

This service may be withdrawn by the service provider or upon request from the served user.

Conditions for SS-CAD shall be defined and linked with the source, basic service request and destination of the call as shown in table F.1.

**Table F.1: Implementation options, authorization conditions**

Implementation options	Source	Basic service request	Destination
Category of calling user	Internal TETRA number, restricted user's ITSI	TETRA teleservices and bearer services	Internal TETRA number External to TETRA
Restricted basic service	Internal TETRA number, restricted user's ITSI	TETRA teleservices and bearer services	Internal TETRA number External to TETRA
Restricted destination address	Internal TETRA number, restricted user's ITSI	TETRA teleservices and bearer services	Internal TETRA number External to TETRA
Restricted destination address	Other TETRA systems or gateways	Supported services	Internal TETRA number
Restricted source address	Internal TETRA number, restricted user's ITSI	TETRA teleservices and bearer services	Internal TETRA number External to TETRA
Restricted source address	Other TETRA systems or gateways	Supported services	Internal TETRA number
Restricted area	Internal TETRA number, restricted user's ITSI	TETRA teleservices and bearer services	Specified TETRA area

As an implementation option, the calling user may receive notification that the call is intercepted according to table F.2.

**Table F.2: Implementation options, notification**

Implementation options	Value
Notification to the restricted user	- No - Yes, without dispatcher's number - Yes, with dispatcher's number

##### F.4.2.1.1 Category of calling user

To provide this implementation option the served user shall supply the following to the service provider:

- 1) the identifications of the restricted users to which authorization shall be given before their request for service can proceed;
- 2) the served user address where all requests for service shall be diverted for approval.



#### **F.4.2.1.2 Restricted basic service**

To provide this implementation option the served user shall supply the following to the service provider:

- 1) the identifications of the restricted users to which authorization shall be given before their request for service can proceed;
- 2) the restricted basic service applicable to each restricted user, for which authorization shall be given by the dispatcher, e.g. clear speech group call;

NOTE: If no basic service is inserted by the user, this is interpreted as all services.

- 3) the served user address where all requests for service shall be diverted for approval.

#### **F.4.2.1.3 Restricted destination address**

To provide this implementation option the served user shall supply the following to the service provider:

- 1) the identifications of the restricted destination address(es) or gateway address(es), to which, all incoming calls shall be authorized before being offered;
- 2) the restricted basic service(s) applicable to each restricted destination address, for which authorization shall be given by the dispatcher, e.g. individual clear speech call;

NOTE: If no basic service is inserted by the user, this is interpreted as all services.

- 3) the served user address where all requests for service shall be diverted for approval.

#### **F.4.2.1.4 Restricted source address**

To provide this implementation option the served user shall supply the following to the service provider:

- 1) the identifications of the restricted source address(es) or gateway address(es), from which, all incoming calls shall be authorized before being offered;
- 2) the restricted basic service(s) applicable to each restricted source address, for which authorization shall be given by the dispatcher, e.g. individual clear speech call;

NOTE: If no basic service is inserted by the user, this is interpreted as all services;

- 3) the served user address where all requests for service shall be diverted for approval.

#### **F.4.2.1.5 Restricted area**

To provide this implementation option the served user shall supply the following to the service provider:

- 1) the identifications of the restricted users to which authorization shall be given before their request for service can proceed;
- 2) the restricted areas, applicable to each restricted user, for which authorization shall be given by the dispatcher before the call request can proceed;
- 3) the restricted basic service applicable to each restricted user, for which authorization shall be given by the dispatcher, e.g. clear speech group call;

NOTE: If no basic service is inserted by the user, this is interpreted as all services.

- 4) the served user address where all requests for service shall be diverted for approval.

#### **F.4.2.1.6 Verification and acceptance**

In all cases, verification of the restricted users shall be accomplished before completing the SS-CAD provision. This verification is done by a check of the restricted users numbers to ascertain if the numbers are within the jurisdiction of the served user, and within the allowed number range.

When the served user is provided with SS-CAD, the service provider shall return notification of acceptance or rejection of the request to the served user. This notification shall include the implementation option, the restricted users and to which basic services SS-CAD is registered.

As an operator option the restricted users may receive a notification of the services to which SS-CAD shall apply.

#### **F.4.2.2 Normal procedures**

##### **F.4.2.2.1 Activation, deactivation, definition, registration, interrogation, and cancellation**

###### **F.4.2.2.1.1 Activation and deactivation**

The supplementary service shall be activated and/or deactivated upon provision and/or withdrawal or may be activated and/or deactivated by the served user.

###### **F.4.2.2.1.2 Definition**

Definition shall not be applicable to SS-CAD.

###### **F.4.2.2.1.3 Registration**

The served user shall be registered upon provision.

###### **F.4.2.2.1.4 Interrogation**

The served user may interrogate the system. The TETRA network shall support interrogation on a per number basis for all basic services and/or for a served user specified basic service. The TETRA response to an interrogation request may provide the following information to the user:

- activated or deactivated state of the supplementary service;
- restricted users;
- applicable basic services;
- applicable destination address/es.

##### **F.4.2.2.2 Invocation and operation**

NOTE: In the following subclauses, the calling or called party address may be replaced by, or include, a gateway address for calls to or from a TETRA network.

###### **F.4.2.2.2.1 Outgoing calls**

In the case of outgoing calls from a restricted user, this supplementary service shall be invoked by the infrastructure when a call request is received from the restricted user. The infrastructure shall be able to use the calling party address, the called party address or area, and the basic service request to determine whether the SS-CAD shall be invoked.

Should authorization be required, an indication may be optionally sent to the restricted user and the call is temporarily diverted to the served user for authorization. A notification of the calling party address, the called party address or area, the basic service request and the condition for the generation of the authorization request is presented to the served user. The served user/dispatcher may interrogate the restricted user for the reason of the call before authorization is granted.

Should authorization be granted, the dispatcher shall forward a confirmation of authorization to the infrastructure thus allowing the call set up request to continue.

Should authorization not be granted, the dispatcher shall forward a barring indication to the infrastructure and the call shall be disconnected. The disconnection shall include an indication to the restricted user that the call has been disconnected as authority to proceed has not been given.

#### **F.4.2.2.2.2 Incoming calls**

In the case of incoming calls to a restricted user, this supplementary service shall be invoked by the infrastructure when a call request to the restricted user is received. The infrastructure shall be able to use the calling party address, the restricted user's address and the basic service request to determine whether SS-CAD should be invoked.

Should authorization be required, an indication may be optionally sent to the calling party and the call is temporarily diverted to the served user for authorization. A notification of the calling party address, the called party address, the area, the basic service request and the condition for the generation of the authorization request shall be sent to the served user. The served user may interrogate the calling user for the reason of the call before authorization is granted.

Should authorization be granted, the served user shall forward a confirmation of authorization to the infrastructure thus allowing the call set up request to continue.

Should authorization not be granted, the served user shall forward a barring indication to the infrastructure. The call shall be disconnected. The disconnection shall include an indication to the calling party where possible that the call has been disconnected as authority to proceed has not been given.

Once authority has been given for a call to proceed, there shall not be any need for the call to be returned to the served user for further authorization providing that the authorized call remains within the bounds of what has been authorized.

#### **F.4.2.2.2.3 Category of calling user**

If this condition is selected, all calls made by the restricted user shall be intercepted.

#### **F.4.2.2.2.4 Restricted basic service**

If this condition is selected, only outgoing calls of a restricted basic service made by restricted user's shall be intercepted.

#### **F.4.2.2.2.5 Restricted destination address**

If this condition is selected, incoming calls of a restricted basic service to restricted user's or to gateways shall be intercepted.

#### **F.4.2.2.2.6 Restricted area**

If this condition is selected, outgoing calls of a restricted basic service made by restricted user's to a restricted area shall be intercepted.

#### **F.4.2.2.3 Cancellation**

Cancellation shall not be applicable to SS-CAD.

#### **F.4.2.3 Exceptional procedures**

##### **F.4.2.3.1 Activation, deactivation, definition, registration, interrogation, and cancellation**

##### **F.4.2.3.1.1 Activation**

If the system cannot accept an activation request, the served user shall receive a notification that SS-CAD activation was not successful. Possible causes can be:

- service or condition not subscribed to;
- insufficient information;
- invalid ITSI for the restricted user;
- invalid ITSI/GTSI for the destination address;
- invalid gateway for the destination address;
- basic service to which relevance is requested is not subscribed to;
- unauthorized user.

#### **F.4.2.3.1.2          Deactivation**

If the infrastructure cannot accept a request for deactivation, the registered user shall receive a notification that SS-CAD deactivation was not successful. Possible causes can be:

- service or option not subscribed to;
- insufficient information;
- invalid ITSI for the restricted user;
- invalid ITSI/GTSI for the destination address;
- invalid gateway for the destination address;
- basic service to which relevance is requested is not subscribed to;
- unauthorized user.

If the infrastructure deactivates SS-CAD without the served user having requested deactivation (e.g. when an exceptional condition occurs), the served user shall receive notification along with the cause.

#### **F.4.2.3.1.3          Definition**

Exceptional procedures for definition shall not be applicable to SS-CAD.

#### **F.4.2.3.1.4          Registration**

Exceptional procedures for registration shall not be applicable to SS-CAD.

#### **F.4.2.3.1.5          Interrogation**

If the TETRA network cannot accept an interrogation request, the interrogating user shall receive a notification that SS-CAD interrogation was unsuccessful. Possible causes for rejection can be:

- service or option not subscribed to;
- insufficient information;
- invalid ITSI for the restricted user;
- invalid ITSI/GTSI for the destination address;
- invalid gateway for the destination address;
- basic service to which relevance is requested is not subscribed to;
- unauthorized user.

**F.4.2.3.2 Cancellation**

Exceptional procedures for cancellation shall not be applicable to SS-CAD.

**F.4.2.3.3 Invocation and operation**

If the infrastructure cannot invoke the service, the cause shall be returned to the served user.

**F.4.3 Interactions with other supplementary services**

**F.4.3.1 Calling Line Identification Presentation (SS-CLIP)**

SS-CAD shall not have any interaction with SS-CLIP.

**F.4.3.2 Connected Line identification Presentation (SS-COLP)**

SS-CAD shall not have any interaction with SS-COLP.

The interception to the dispatcher shall not invoke SS-COLP.

**F.4.3.3 Calling/Connected Line Identification Restriction (SS-CLIR)**

SS-CAD shall not have any interaction with SS-CLIR.

**F.4.3.4 Call Report**

SS-CAD shall not have any interaction with SS-CR.

**F.4.3.5 Talking Party Identification (SS-TPI)**

SS-CAD shall not have any interaction with SS-TPI.

**F.4.3.6 Call Forwarding Unconditional (SS-CFU)**

SS-CAD shall not have any interaction with SS-CFU.

**F.4.3.7 Call Forwarding on mobile subscriber Busy (SS-CFB)**

SS-CAD shall not have any interaction with SS-CFB.

**F.4.3.8 Call Forwarding on No Reply (SS-CFNRy)**

SS-CAD shall not have any interaction with SS-CFNRy.

**F.4.3.9 Call Forwarding on mobile subscriber Not Reachable (SS-CFNRc)**

SS-CAD shall not have any interaction with SS-CFNRc.

**F.4.3.10 List Search Call (SS-LSC)**

SS-CAD shall not have any interaction with SS-LSC.

**F.4.3.11 Call authorized by dispatcher**

SS-CAD shall not have any interaction with SS-CAD.

**F.4.3.12 Short Number Addressing (SS-SNA)**

SS-CAD shall not have any interaction with SS-SNA.

As an operator option it may be possible to allow restricted user's to automatically complete call requests made with SS-SNA without requesting authorization from a dispatcher whereas normally they shall require authorization to be given for the same calls made without SS-SNA.

**F.4.3.13 Area Selection (SS-AS)**

SS-CAD shall not have any interaction with SS-AS.

**F.4.3.14 Access Priority (SS-AP)**

SS-CAD shall not have any interaction with SS-AP.

**F.4.3.15 Priority Call (SS-PC)**

SS-CAD shall not have any interaction with SS-PC.

**F.4.3.16 Call Waiting (SS-CW)**

SS-CAD shall not have any interaction with SS-CW.

**F.4.3.17 Call Hold (SS-HOLD)**

SS-CAD shall not have any interaction with SS-HOLD.

**F.4.3.18 Call Completion to Busy Subscriber (SS-CCBS)**

SS-CAD shall not have any interaction with SS-CCBS.

The restricted user shall be able to request the SS-CCBS supplementary service if the original call has been authorized by the dispatcher.

**F.4.3.19 Late Entry (SS-LE)**

SS-CAD shall not have any interaction with SS-LE.

**F.4.3.20 Transfer of Control (SS-TC)**

SS-CAD shall not have any interaction with SS-TC.

**F.4.3.21 Pre-emptive Priority Call (SS-PPC)**

SS-CAD shall not have any interaction with SS-PPC.

**F.4.3.22 Include Call (SS-IC)**

SS-CAD shall not have any interaction with SS-IC.

If the parameters of the SS-IC are such that the restricted user requires authorization from the dispatcher, then the SS-IC request shall generate a request for authorization.

**F.4.3.23 Advice of Charge (SS-AoC)**

SS-CAD shall not have any interaction with SS-AoC.

**F.4.3.24 Barring of Outgoing Calls (SS-BOC)**

SS-CAD shall not have any interaction with SS-BOC.

**F.4.3.25 Barring of Incoming Calls (SS-BIC)**

SS-CAD shall not have any interaction with SS-BIC.

**F.4.3.26 Discreet Listening (SS-DL)**

SS-CAD shall not have any interaction with SS-DL.

**F.4.3.27 Ambience Listening (SS-AL)**

SS-CAD shall not have any interaction with SS-AL.

An SS-AL call may require authorization from a dispatcher.

**F.4.3.28 Dynamic Group Number Assignment (SS-DGNA)**

SS-CAD shall not have any interaction with SS-DGNA.

**F.4.3.29 Call Completion on No Reply (SS-CCNR)**

SS-CAD shall not have any interaction with SS-CNR.

The restricted user shall be able to request the SS-CNR supplementary service if the original call has been authorized by the dispatcher.

**F.4.3.30 Call Retention**

SS-CAD shall not have any interaction with SS-CR.

**F.4.4 Interworking considerations**

SS-CAD shall be available across the intersystem interface. If the restricted user has moved to a visited TETRA network and wishes to make a call that would normally require dispatcher approval in the home TETRA system, then the call request may be routed to the dispatcher in the home TETRA system to seek authorization for the call request.

#### F.4.5 Overall SDL

Figure F.1 contains the dynamic description of SS-CAD using the Specification and Description Language (SDL) defined in ITU-T Recommendation Z.100 [1]. The SDL process represents the behaviour of the network in providing SS-CAD. Input signals from the left and output signals to the left represent primitives from and to the served user.

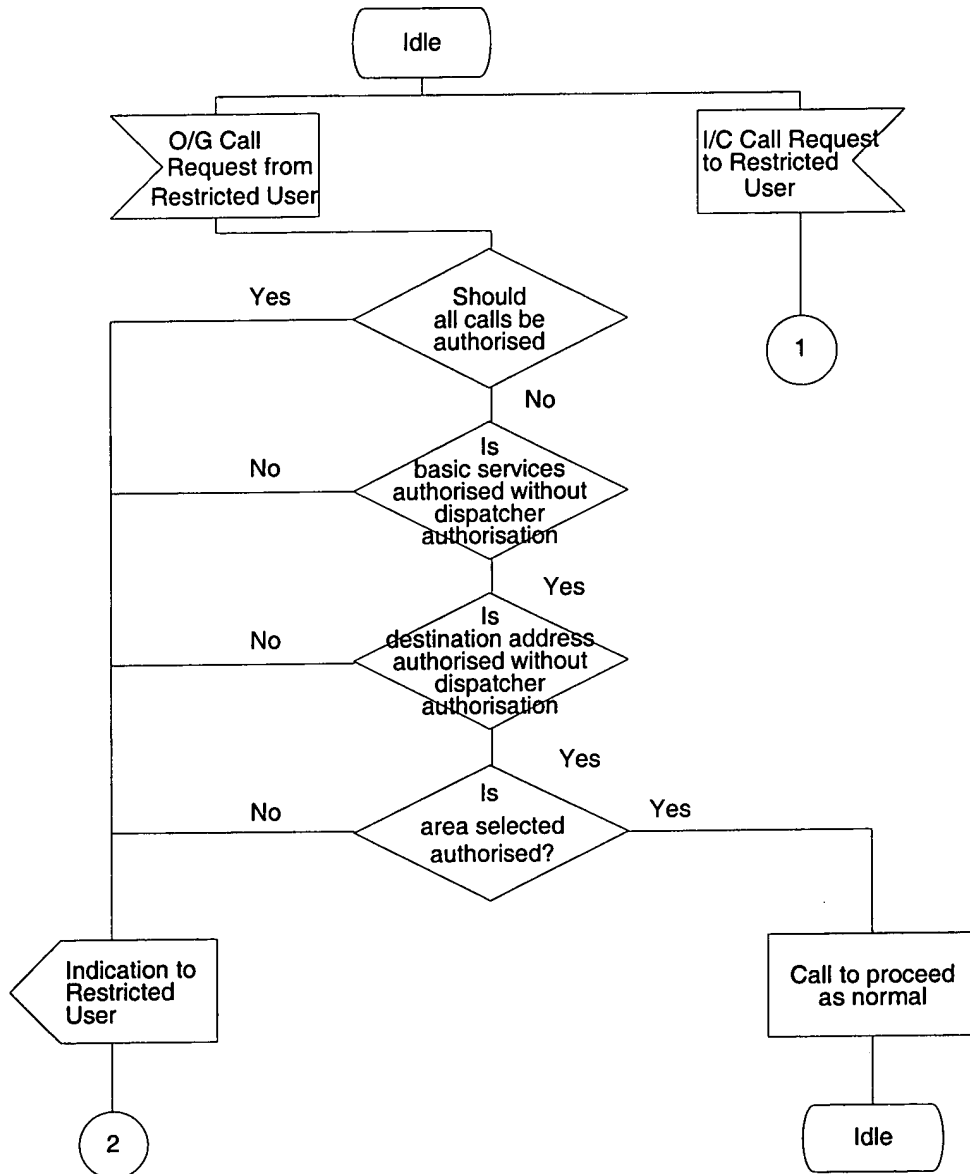


Figure F.1 (sheet 1 of 2): SS-CAD supplementary service, overall SDL



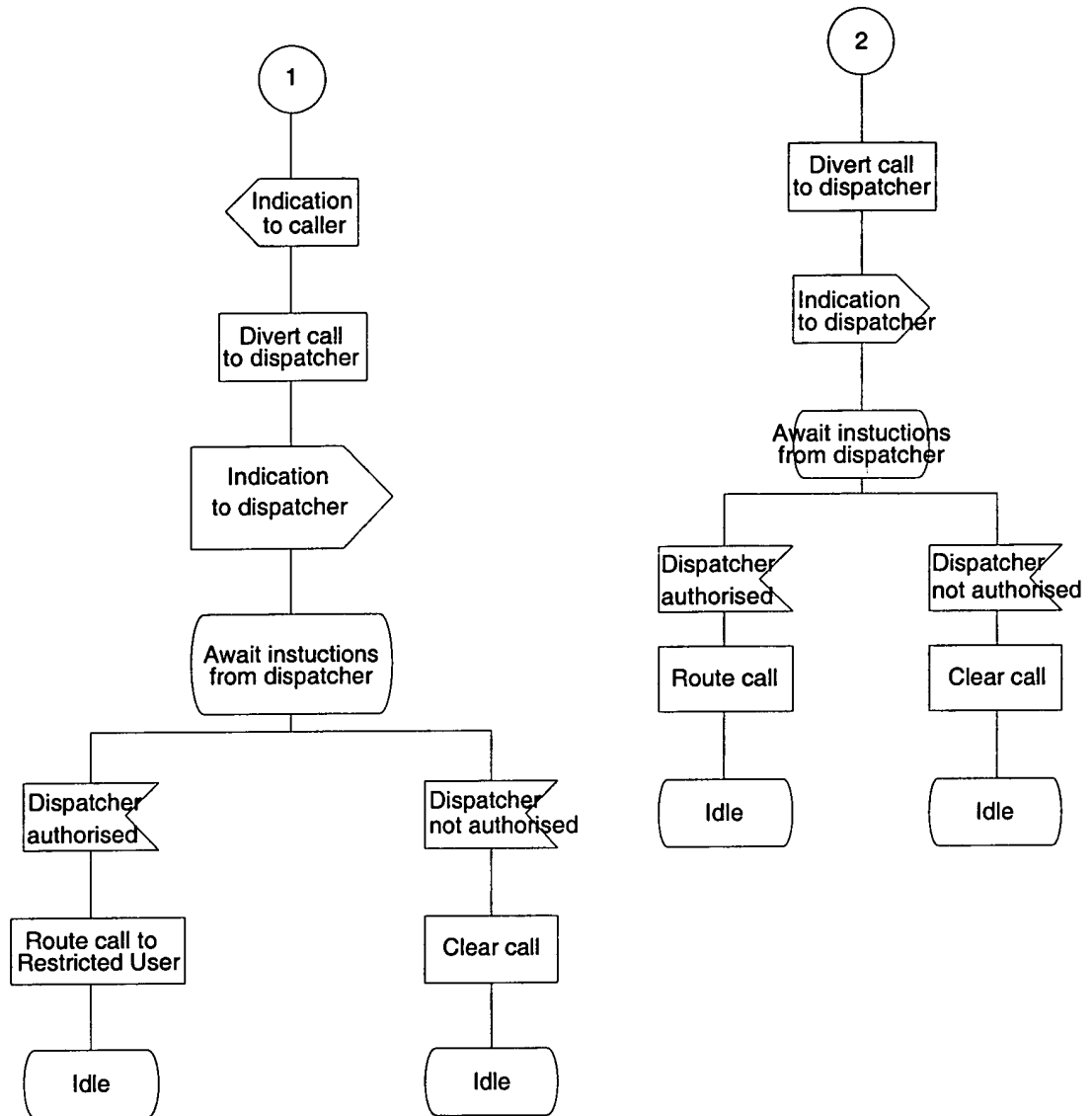


Figure F.1 (sheet 2 of 2): SS-CAD supplementary service, overall SDL

## **Annex G (informative): Supplementary Service stage 1: Late Entry (SS-LE) (TETRA 03.74)**

### **G.1 Scope**

This draft Interim European Telecommunication Standard (I-ETS) defines the stage 1 specifications of the Supplementary Service Late Entry (SS-LE) for the Trans-European Trunked Radio (TETRA). Stage 1 is an overall service description from the users point of view but does not deal with the details of the human interface itself.

This I-ETS specifies the service description of the supplementary service and the procedures to be expected with successful and unsuccessful outcomes. In addition this I-ETS specifies the interactions with other TETRA supplementary services and interworking considerations.

Charging principles shall be outside the scope of this I-ETS.

The SS-LE allows radio users to be informed of and, if they are concerned, to join an already existing multipoint speech call.

### **G.2 Normative references**

This I-ETS incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this I-ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ITU-T Recommendation Z.100 (1993): "Specification and Description Language (SDL)".

### **G.3 Definitions and abbreviations (TETRA 01.04)**

#### **G.3.1 Definitions**

For the purposes of this I-ETS the following definitions apply:

**Authorized user:** an identified user who is able to define the SS-LE parameters.

**Bearer service:** a type of telecommunication service that provides the capability for the transmission of signals between user-network interfaces.

**Forced late entry:** as a user application in the mobile station, the user may be forced to join the multipoint call as soon as he receives a late entry broadcast or late entry paging message. If the user is already engaged in another communication, the user may be forced to join the highest priority call.

**Late entry acknowledgement:** indication sent in SS-LE messages by a SwMI to inform a member who would like to join the call that he has to inform the SwMI of his entering the call.

**Late entry broadcast:** indication sent by a SwMI to inform members of a multipoint call which are currently not already involved in this call that they can join directly an existing communication (a channel is already allocated in this cell).

**Late entry paging:** indication sent by a SwMI to inform members of a multipoint call which are currently not already involved in this call that they need to ask for a communication channel for that call if they want to participate (a channel is not yet allocated in this cell).

**Multipoint call:** a call supporting a point-to-multipoint teleservice or bearer service. It can be either a group call, an acknowledged group call or a broadcast call.

**Supplementary service:** a supplementary service modifies or supplements a bearer service or a teleservice. A supplementary service cannot be offered to a customer as a stand alone service. It should be offered in combination with a bearer service or a teleservice.

**Teleservice:** a type of telecommunications service that provides the complete capability, including terminal equipment functions, for communication between users according to agreed protocols.

### G.3.2 Abbreviations

#### G.3.2.1 General abbreviations

For the purposes of this I-ETS the following general abbreviations apply:

GTSI	Group TETRA Subscriber Identity
ISDN	Integrated Services Digital Network
ISI	Inter System Interface
ITSI	Individual TETRA Subscriber Identity
LS	Line Station
MS	Mobile Station
PSTN	Public Switched Telephone Network
PTN	Private Telephone Network
SDL	(Functional) Specification and Description Language
SS	Supplementary Service

NOTE: The abbreviation SS is only used when referring to a specific supplementary service.

SwMI	Switching and Management Infrastructure
TE	Terminal Equipment
TETRA	Trans-European Trunked Radio

#### G.3.2.2 Supplementary service abbreviations

For the purposes of this I-ETS the following supplementary service abbreviations apply:

SS-AL	Ambience Listening
SS-AoC	Advice of Charge
SS-AP	Access Priority
SS-AS	Area Selection
SS-BIC	Barring of Incoming Calls
SS-BOC	Barring of Outgoing Calls
SS-CAD	Call Authorized by Dispatcher
SS-CCBS	Call Completion to Busy Subscriber
SS-CCNR	Call Completion on No Reply
SS-CFB	Call Forwarding on Busy
SS-CFNRy	Call Forwarding on No Reply
SS-CFNRc	Call Forwarding on Mobile Subscriber Not Reachable
SS-CFU	Call Forwarding Unconditional
SS-CLIP	Calling Line Identification Presentation
SS-CLIR	Calling/Connected Line Identification Restriction
SS-COLP	Connected Line Identification Presentation
SS-CR	Call Report
SS-CRT	Call Retention
SS-CW	Call Waiting
SS-DGNA	Dynamic Group Number Assignment
SS-DL	Discreet Listening
SS-HOLD	Call Hold
SS-IC	Include Call
SS-LE	Late Entry
SS-LSC	List Search Call
SS-PC	Priority Call
SS-PPC	Pre-emptive Priority Call
SS-SNA	Short Number Addressing
SS-TC	Transfer of Control

SS-TPI Talking Party Identification

## **G.4 Supplementary Service Late Entry (SS-LE) Stage 1 specification**

### **G.4.1 Description**

#### **G.4.1.1 General description**

During a multipoint speech call, the infrastructure shall send (when necessary) Late Entry indications related to this call to allow group members to join the ongoing speech call. This supplementary service may be used regardless of whether the members of the group are engaged in a call or not.

SS-LE shall be related to the called group identity.

#### **G.4.1.2 Qualifications on applicability to telecommunication services**

This supplementary service shall be applicable to all TETRA multipoint speech teleservices and bearer services.

### **G.4.2 Procedures**

#### **G.4.2.1 Provision and withdrawal**

The service provider may provide two services.

Service 1: provision and withdrawal of SS-LE shall be provided by pre-arrangement with the service provider against a specific GTSI.

Service 2: provision and withdrawal of SS-LE shall be provided by pre-arrangement with the service provider to the authorized user. The SS-LE supplementary service can be withdrawn by the service provider for administrative purposes or at the request of the authorized user.

The authorized user shall be able to carry out the process of definition upon provision.

Late entry paging shall be a network implementation option which may be withdrawn for administrative reasons.

#### **G.4.2.2 Normal procedures**

##### **G.4.2.2.1 Activation, deactivation, definition, registration, interrogation, and cancellation**

###### **G.4.2.2.1.1 Activation and deactivation**

Service 1: the supplementary service shall be activated upon provision and deactivated upon withdrawal.

Service 2: the supplementary service shall be activated and deactivated upon request from the authorized user. In order to activate and/or deactivate the supplementary service the authorized user shall supply:

- 1) the group identity;
- 2) a applicable TETRA multipoint speech teleservice/bearer service.

###### **G.4.2.2.1.2 Definition**

The definition process shall be carried out upon provision. Additionally, a TETRA network shall accept definition requests from the authorized user.

To define SS-LE the authorized user shall supply:

- 1) a specific group identity;
- 2) the applicable TETRA multipoint speech teleservice/bearer service.

#### **G.4.2.2.1.3 Registration**

Registration shall be used in order to identify the authorized user.

Service 2: the authorized user shall be provided with the list of GTSI where he is able to carry out SS-LE procedures.

#### **G.4.2.2.1.4 Interrogation**

SS-LE may be interrogated on a GTSI basis by any member of the group or an authorized user.

The results of an interrogation shall be:

- 1) availability of the service against the GTSI;
- 2) activated state of the service.

#### **G.4.2.2.1.5 Cancellation**

Procedures for cancellation shall not be applicable to SS-LE.

#### **G.4.2.2.2 Invocation and operation**

##### **G.4.2.2.2.1 Invocation**

SS-LE shall be invoked by the network if SS-LE is activated for the service related to the called group identity.

##### **G.4.2.2.2.2 Operation**

SS-LE indications shall be sent for the duration of a multipoint call.

SS-LE indications contain relevant information on the group call. Actions due to SS-LE indications are outside the scope of this I-ETS.

NOTE: As a user application in the mobile station, the user may be forced to join the ongoing multipoint call as soon as he receives a late entry broadcast or paging message. If the user is already engaged in another communication, the user may be forced to join the highest priority call.

The periodicity of LE broadcasts shall be outside the scope of this I-ETS.

#### **G.4.2.3 Exceptional procedures**

##### **G.4.2.3.1 Activation, deactivation, definition, registration, interrogation, and cancellation**

##### **G.4.2.3.1.1 Activation and deactivation**

If the system cannot accept an activation or deactivation request, the authorized user shall receive a notification the SS-LE activation or deactivation was not successful. Possible causes can be:

- insufficient information;
- invalid GTSI;
- invalid basic service;
- user not authorized.

**G.4.2.3.1.2          Definition**

If the system cannot accept a definition request, the authorized user shall receive a notification that the SS-LE definition was not successful. Possible causes can be:

- insufficient information;
- invalid GTSI;
- invalid basic service;
- user not authorized.

**G.4.2.3.1.3          Registration**

Not applicable.

**G.4.2.3.1.4          Interrogation**

If the network cannot accept an interrogation request, the interrogating user shall receive a notification that the SS-LE interrogation was unsuccessful. The possible causes for rejection can be:

- service not provided by the network;
- interrogation against a number which is not a valid GTSI;
- interrogating user is not a member of the group or an authorized user.

**G.4.2.3.1.5          Cancellation**

Exceptional procedures shall not be applicable to SS-LE.

**G.4.2.3.2          Invocation and operation**

**G.4.2.3.2.1          Invocation**

Exceptional procedures shall not be applicable to SS-LE.

**G.4.2.3.2.2          Operation**

Exceptional procedures shall not be applicable to SS-LE.

**G.4.3          Interactions with other supplementary services**

Interactions with other TETRA supplementary services are specified below.

**G.4.3.1          Calling Line Identification Presentation (SS-CLIP)**

SS-LE shall not have any interaction with calling line identification presentation.

**G.4.3.2          Connected Line identification Presentation (SS-COLP)**

Not applicable.

**G.4.3.3          Calling/Connected Line Identification Restriction (SS-CLIR)**

SS-LE shall not have any interaction with calling/connected line identification restriction.

**G.4.3.4          Call Report (SS-CR)**

Not applicable.

**G.4.3.5 Talking Party Identification (SS-TPI)**

SS-LE shall not have any interaction with SS-TPI.

**G.4.3.6 Call Forwarding Unconditional (SS-CFU)**

Not applicable. If SS-LE is activated against the GTSI and this GTSI subsequently forwards all calls to the forwarded-to GTSI, the SS-LE functionality shall not be transferred to the forwarded-to GTSI. Only SS-LE related to the forwarded-to GTSI shall be applied.

**G.4.3.7 Call Forwarding on mobile subscriber Busy (SS-CFB)**

Not applicable. If SS-LE is activated against the GTSI and this GTSI subsequently forwards all calls to the forwarded-to GTSI, the SS-LE functionality shall not be transferred to the forwarded-to GTSI. Only SS-LE related to the forwarded-to GTSI shall be applied.

**G.4.3.8 Call Forwarding on No Reply (SS-CFNRy)**

Not applicable.

**G.4.3.9 Call Forwarding on mobile subscriber Not Reachable (SS-CFNRc)**

Not applicable. The GTSI cannot be not reachable.

**G.4.3.10 List Search Call (SS-LSC)**

SS-LE shall not have any interaction with SS-LSC.

**G.4.3.11 Call Authorized by Dispatcher (SS-CAD)**

SS-LE shall not have any interaction with SS-CAD.

**G.4.3.12 Short Number Addressing (SS-SNA)**

SS-LE shall not have any interaction with SS-SNA.

**G.4.3.13 Area Selection (SS-AS)**

SS-LE shall not have any interaction with SS-AS. The SS-LE supplementary service shall be offered in the area selected for the call.

**G.4.3.14 Access Priority (SS-AP)**

SS-LE shall not have any interaction with SS-AP.

**G.4.3.15 Priority Call (SS-PC)**

SS-LE shall not have any interaction with SS-PC. The SS-PC indication shall be displayed or shall be used by the members of the group to choose their final communication.

**G.4.3.16 Call Waiting (SS-CW)**

Not applicable.

**G.4.3.17 Call Hold (SS-HOLD)**

SS-LE shall not have any interaction with SS-HOLD.

**G.4.3.18 Call Completion to Busy Subscriber (SS CCBS)**

Not applicable.

**G.4.3.19 Late Entry (SS-LE)**

Not applicable.

**G.4.3.20 Transfer of Control (SS-TC)**

SS-LE shall not have any interaction with SS-TC).

**G.4.3.21 Pre-emptive Priority Call (SS-PPC)**

SS-LE shall not have any interaction with SS-PPC.

**G.4.3.22 Include Call (SS-IC)**

SS-LE shall not have any interaction with SS-IC.

**G.4.3.23 Advice of Charge (SS-AoC)**

SS-LE shall not have any interaction with SS-AoC.

**G.4.3.24 Barring of Outgoing Calls (SS-BOC)**

SS-LE shall not have any interaction with SS-BOC.

**G.4.3.25 Barring of Incoming Calls (SS-BIC)**

Not applicable. SS-BIC shall not apply to a user called in a group call. If barring is needed it shall be obtained by removing that user from the group.

**G.4.3.26 Discreet Listening (SS-DL)**

SS-LE shall not have any interaction with SS-DL.

**G.4.3.27 Ambience Listening (SS-AL)**

Not applicable.

**G.4.3.28 Dynamic Group Number Assignment (SS-DGNA)**

SS-LE shall not have any interaction with SS-DGNA.

**G.4.3.29 Call Completion on No Reply (SS-CCNR)**

Not applicable.

**G.4.3.30 Call Retention (SS-CR)**

SS-LE shall not have any interaction with SS-CR.

**G.4.4 Interworking considerations**

SS-LE shall be supported over ISI.



#### G.4.5 Overall SDL

Figure G.1 contains the dynamic description of SS-LE using the Specification Description Language (SDL) defined in ITU-T Recommendation Z.100 [1]. The SDL process represents the behaviour of the network in providing SS-LE.

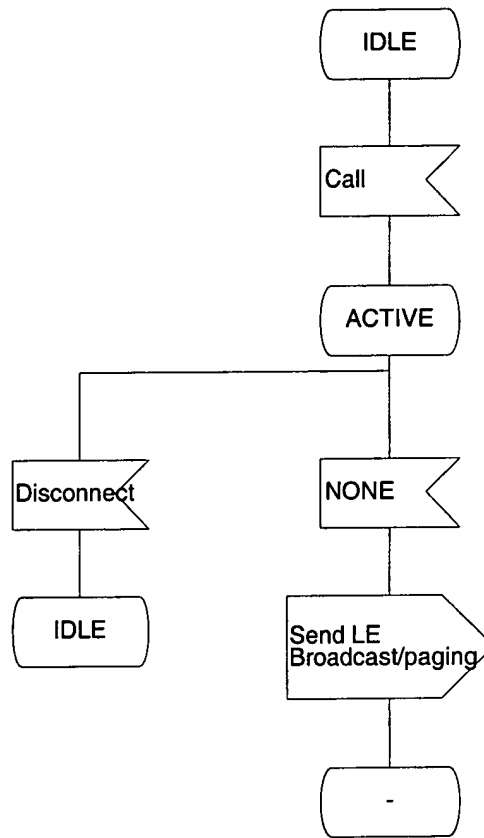


Figure G.1: SS-LE supplementary service SDL

## **Annex H (informative): Supplementary Service stage 1: Dynamic Group Number Assignment (SS-DGNA) (TETRA 03.83)**

### **H.1 Scope**

This draft Interim European Telecommunication Standard (I-ETS) defines the stage 1 specifications of the Supplementary Service Dynamic Group Number Assignment (SS-DGNA) for the Trans-European Trunked Radio (TETRA). Stage 1 is an overall service description from the users point of view but does not deal with the details of the human interface itself.

This I-ETS specifies the service description of the supplementary service and the procedures to be expected with successful and unsuccessful outcomes. In addition this I-ETS specifies the interactions with other TETRA supplementary services and interworking considerations.

Charging principles shall be outside the scope of this I-ETS.

The SS-DGNA enables a served user to dynamically create new groups.

### **H.2 Normative references**

This I-ETS incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this I-ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ITU-T Recommendation Z.100 (1993): "Specification and Description Language (SDL)".

### **H.3 Definitions and abbreviations (TETRA 01.04)**

#### **H.3.1 Definitions**

For the purposes of this I-ETS the following definitions apply:

**Base Station (BS):** a physical grouping of equipment which provides the fixed portion of the air interface. One base station transmits and receives radio signals to and from a single location area (a single region of geographical coverage). A BS contains at least one Base Radio Stack (BRS).

**Bearer service:** a type of telecommunication service that provides the capability for the transmission of signals between user-network interfaces.

**Call related DGNA:** creation of a group based on the participants of a referenced call.

**Call unrelated DGNA:** creation of a group based on identities.

**Circuit switched connection:** a connection that is established on request between two or more terminals and provides the exclusive use of the connection for information transfer until it is released.

**DGNA number:** group number created with SS-DGNA.

**Mobile Station (MS):** a physical grouping that contains all of the mobile equipment that is used to obtain TETRA services. By definition, a mobile station contains at least one Mobile Radio Stack (MRS).

**Served user:** the user who can create, modify and delete his DGNA numbers.

**SS-SNA-1:** part of SS-SNA where a short number is used as an alias for an identity.

**Supplementary service:** a supplementary service modifies or supplements a bearer service or a teleservice. A supplementary service cannot be offered to a customer as a stand alone service. It should be offered in combination with a bearer service or a teleservice.

**Switching and Management Infrastructure (SwMI):** all of the TETRA equipment for a Voice plus Data (V+D) network except for subscriber terminals. The SwMI enables subscriber terminals to communicate with each other via the SwMI.

**NOTE:** The SwMI may also make it possible for subscriber equipment to communicate via other transit networks to external applications. Mobile Stations (MS) can access the SwMI using the air interface.

**Teleservice:** a type of telecommunications service that provides the complete capability, including terminal equipment functions, for communication between users according to agreed protocols.

### H.3.2 Abbreviations

#### H.3.2.1 General abbreviations

For the purposes of this I-ETS the following general abbreviations apply:

BS	Base Station
GTSI	Group TETRA Subscriber Identity
ISDN	Integrated Services Digital Network
ISI	Inter System Interface
ITSI	Individual TETRA Subscriber Identity
LS	Line Station
MS	Mobile Station
PSTN	Public Switched Telephone Network
PTN	Private Telephone Network
SDL	(Functional) Specification and Description Language
SS	Supplementary Service

**NOTE:** The abbreviation SS is only used when referring to a specific supplementary service.

SwMI	Switching and Management Infrastructure
TETRA	Trans-European Trunked Radio

#### H.3.2.2 Supplementary service abbreviations

For the purposes of this I-ETS the following supplementary service abbreviations apply:

SS-AL	Ambience Listening
SS-AoC	Advice of Charge
SS-AP	Access Priority
SS-AS	Area Selection
SS-BIC	Barring of Incoming Calls
SS-BOC	Barring of Outgoing Calls
SS-CAD	Call Authorized by Dispatcher
SS-CCBS	Call Completion to Busy Subscriber
SS-CCNR	Call Completion on No Reply
SS-CFB	Call Forwarding on Busy
SS-CFNRY	Call Forwarding on No Reply
SS-CFNRC	Call Forwarding on Mobile Subscriber Not Reachable
SS-CFU	Call Forwarding Unconditional
SS-CLIP	Calling Line Identification Presentation
SS-CLIR	Calling/Connected Line Identification Restriction
SS-COLP	Connected Line Identification Presentation
SS-CR	Call Report
SS-CRT	Call Retention
SS-CW	Call Waiting
SS-DGNA	Dynamic Group Number Assignment
SS-DL	Discreet Listening
SS-HOLD	Call Hold
SS-IC	Include Call
SS-LE	Late Entry
SS-LSC	List Search Call

SS-PC	Priority Call
SS-PPC	Pre-emptive Priority Call
SS-SNA	Short Number Addressing
SS-TC	Transfer of Control
SS-TPI	Talking Party Identification

## **H.4 Supplementary Service Dynamic Group Number Assignment (SS-DGNA) Stage 1 specification**

### **H.4.1 Description**

#### **H.4.1.1 General description**

SS-DGNA shall allow a served user or an authorized user to create, modify and delete group(s).

The SS-DGNA may be used to group all the participants in an ongoing call (call related DGNA). SS-DGNA may also be used to create groups based on identities (including SNA-1) (call unrelated DGNA).

As a network option, call related DGNA may be invoked after the call release within a predefined time.

The lifetime and the management actions on those SS-DGNA numbers shall be outside the scope of this I-ETS.

#### **H.4.1.2 Qualifications on applicability to telecommunication services**

This supplementary service shall be applicable to all TETRA circuit mode teleservices and bearer services.

### **H.4.2 Procedures**

#### **H.4.2.1 Provision and withdrawal**

SS-DGNA shall be available to all TETRA users who have subscribed to this service.

The served user and the authorized user shall be identified upon provision.

The service may be provided after pre-arrangement or withdrawn by the service provider.

As a network option, a range of SS-DGNA numbers may be allocated to the served user for later definition.

#### **H.4.2.2 Normal procedures**

##### **H.4.2.2.1 Activation, deactivation, definition, registration, interrogation, and cancellation**

###### **H.4.2.2.1.1 Activation and deactivation**

SS-DGNA shall be permanently activated upon provision.

###### **H.4.2.2.1.2 Definition**

The definition may differ depending on the requested service: call related SS-DGNA or call unrelated SS-DGNA.

For call unrelated SS-DGNA, the served user or an authorized user shall be able to create/modify a group based on a list of identities by sending a list of subscriber identities to the system. That list can contain individual or group identities, and can use SS-SNA-1 to refer to individual or group identities. List search numbers shall not be part of the list. The authorized user shall be required to send the served user identity to which the SS-DGNA number shall belong.

For call related SS-DGNA, the system shall use the composition of the referenced call to create a new group.

The served user or an authorized user may deassign a SS-DGNA number.

At the conclusion of the definition process, SS-DGNA shall be invoked.

As a network option, either the system may allocate a GTSI or the served/authorized user may choose a GTSI from his list of allocated SS-DGNA numbers.

#### **H.4.2.2.1.3      Registration**

Not applicable.

#### **H.4.2.2.1.4      Interrogation**

SS-DGNA may be interrogated on a SS-DGNA number basis by the served user or an authorized user. The results of an interrogation may be:

- 1)    SS-DGNA completed or not completed on that SS-DGNA number;
- 2)    list of group members with the forwarded or not forwarded information for each ITSJ;
- 3)    list of SS-DGNA numbers the interrogating user has created.

SS-DGNA may be interrogated by an authorized user against a served user identity. The results of an interrogation may be a list of SS-DGNA numbers the authorized user has created for the served user.

#### **H.4.2.2.1.5      Cancellation**

As a network option, SS-DGNA can be cancelled.

The SS-DGNA cancellation shall stop the distribution of the creation/modification/deletion information to the group members.

#### **H.4.2.2.2      Invocation and operation**

After creation of a group, the system shall inform each member of the group of the new group identity.

After modification of a group, the system shall inform the added/removed member of the group of the modification. As a network option, the other members of the group may receive a notification that the group was modified.

After deassignment of a group, the system shall inform each member of the group that the group identity shall no longer be valid.

If the served user or an authorized user sends a dynamic group composition which has already a group number allocated, the SwMI as a network option may inform the served user and may offer him an opportunity for cancellation.

The SS-DGNA operation shall become completed either when all the necessary information have been sent to the group members, or when the SS-DGNA number is deleted or after a certain time-out. The time-out value shall be an operator option.

Upon completion, the system shall indicate the result of the SS-DGNA to the user who has requested the service as shown below:

- SS-DGNA fully completed;
- SS-DGNA completed due to a time-out;
- SS-DGNA number deleted.

#### **H.4.2.3 Exceptional procedures**

##### **H.4.2.3.1 Activation, deactivation, definition, registration, interrogation, and cancellation**

###### **H.4.2.3.1.1 Activation and deactivation**

Not applicable.

###### **H.4.2.3.1.2 Definition**

If the infrastructure cannot accept a definition request, then the cause shall be returned to the served user.

###### **H.4.2.3.1.3 Registration**

Not applicable.

###### **H.4.2.3.1.4 Interrogation**

If the network cannot accept an interrogation request, the interrogating user shall receive a notification that the SS-DGNA interrogation was unsuccessful. The possible causes for rejection can be:

- the GTSI has not been assigned with SS-DGNA;
- interrogating user is not the served user;
- interrogating user is not an authorized user for the specified SS-DGNA number.

###### **H.4.2.3.1.5 Cancellation**

Not applicable.

##### **H.4.2.3.2 Invocation and operation**

If the network cannot accept an invocation request or if the operation fails, the served user shall receive a notification that the SS-DGNA was unsuccessful. The possible causes can be:

- service not provided by the network;
- the user is not the owner of the call;
- the user is not the served user;
- the user is not an authorized user for that SS-DGNA number;
- the user is not an authorized user for that served user identity;
- modification/deletion requested on a GTSI that is not a SS-DGNA number.

If the network encounters some minor exceptional cases during SS-DGNA operation, the served user shall receive a notification that SS-DGNA was completed with some restrictions. The possible causes can be:

- one potential member of the group (ITSI or GTSI) cannot be a member of that group (any reason);
- unknown group (if the SwMI have no knowledge on the group composition).

#### **H.4.3 Interactions with other supplementary services**

Interactions with other TETRA supplementary services are specified below.

**H.4.3.1 Calling Line Identification Presentation (SS-CLIP)**

SS-DGNA shall not have any interaction with SS-CLIP.

**H.4.3.2 Connected Line Identification Presentation (SS-COLP)**

SS-DGNA shall not have any interaction with SS-COLP.

**H.4.3.3 Calling/Connected Line Identification Restriction (SS-CLIR)**

SS-DGNA shall not have any interaction with SS-CLIR.

**H.4.3.4 Call Report (SS-CR)**

SS-DGNA shall not have any interaction with SS-CR.

**H.4.3.5 Talking Party Identification (SS-TPI)**

SS-DGNA shall not have any interaction with SS-TPI.

**H.4.3.6 Call Forwarding Unconditional (SS-CFU)**

SS-DGNA shall not have any interaction with SS-CFU.

**H.4.3.7 Call Forwarding on mobile subscriber Busy (SS-CFB)**

SS-DGNA shall not have any interaction with SS-CFB.

**H.4.3.8 Call Forwarding on No Reply (SS-CFNRy)**

SS-DGNA shall not have any interaction with SS-CFNRy.

**H.4.3.9 Call Forwarding on mobile subscriber Not Reachable (SS-CFNRc)**

SS-DGNA shall not have any interaction with SS-CFNRc.

**H.4.3.10 List Search Call (SS-LSC)**

Call unrelated SS-DGNA: list search numbers shall not be included into the definition list.

Call related SS-DGNA shall not have any interaction with SS-LSC. If some participants of the call have been selected by SS-LSC, the system shall use their attendant identity and not the list search number for the definition.

**H.4.3.11 Call Authorized by Dispatcher (SS-CAD)**

SS-DGNA shall not have any interaction with SS-CAD.

**H.4.3.12 Short Number Addressing (SS-SNA)**

SS-DGNA shall not have any interaction with SS-SNA.

**H.4.3.13 Area Selection (SS-AS)**

SS-DGNA shall not have any interaction with SS-AS.

**H.4.3.14 Access Priority (SS-AP)**

SS-DGNA shall not have any interaction with SS-AP.

**H.4.3.15 Priority Call (SS-PC)**

SS-DGNA shall not have any interaction with SS-PC.

**H.4.3.16 Call Waiting (SS-CW)**

SS-DGNA shall not have any interaction with SS-CW.

**H.4.3.17 Call Hold (SS-HOLD)**

SS-DGNA shall not have any interaction with SS-HOLD.

**H.4.3.18 Call Completion to Busy Subscriber (SS-CCBS)**

SS-DGNA shall not have any interaction with SS-CCBS.

**H.4.3.19 Late Entry (SS-LE)**

SS-DGNA shall not have any interaction with SS-LE.

**H.4.3.20 Transfer of Control (SS-TC)**

SS-DGNA shall not have any interaction with SS-TC.

**H.4.3.21 Pre-emptive Priority Call (SS-PPC)**

SS-DGNA shall not have any interaction with SS-PPC.

**H.4.3.22 Include Call (SS-IC)**

SS-DGNA shall not have any interaction with SS-IC.

**H.4.3.23 Advice of Charge (SS-AoC)**

SS-DGNA shall not have any interaction with SS-AoC.

**H.4.3.24 Barring of Outgoing Calls (SS-BOC)**

SS-DGNA shall not have any interaction with SS-BOC.

**H.4.3.25 Barring of Incoming Calls (SS-BIC)**

SS-DGNA shall not have any interaction with SS-BIC.

**H.4.3.26 Discreet Listening (SS-DL)**

SS-DGNA shall not have any interaction with SS-DL.

**H.4.3.27 Ambience Listening (SS-AL)**

SS-DGNA shall not have any interaction with SS-AL.

**H.4.3.28 Dynamic Group Number Assignment (SS-DGNA)**

Not applicable.

**H.4.3.29 Call Completion on No Reply (SS-CCNR)**

SS-DGNA shall not have any interaction with SS-CCNR.



#### **H.4.3.30 Call Retention (SS-CR)**

Not applicable.

#### **H.4.4 Interworking considerations**

If a user wants to use SS-DGNA in a visited network, it implies that the service shall be offered by the latter and that the overall process shall be centralised in the home SwMI. The request and the associated list (if any) shall be sent to the home system, and all information's and mobile data bases programming orders shall be issued from the home SwMI.

#### H.4.5 Overall SDL

Figure H.1 contains the dynamic description of SS-DGNA using the Specification Description Language (SDL) defined in ITU-T Recommendation Z.100 [1]. The SDL process represents the behaviour of the network in providing SS-DGNA.

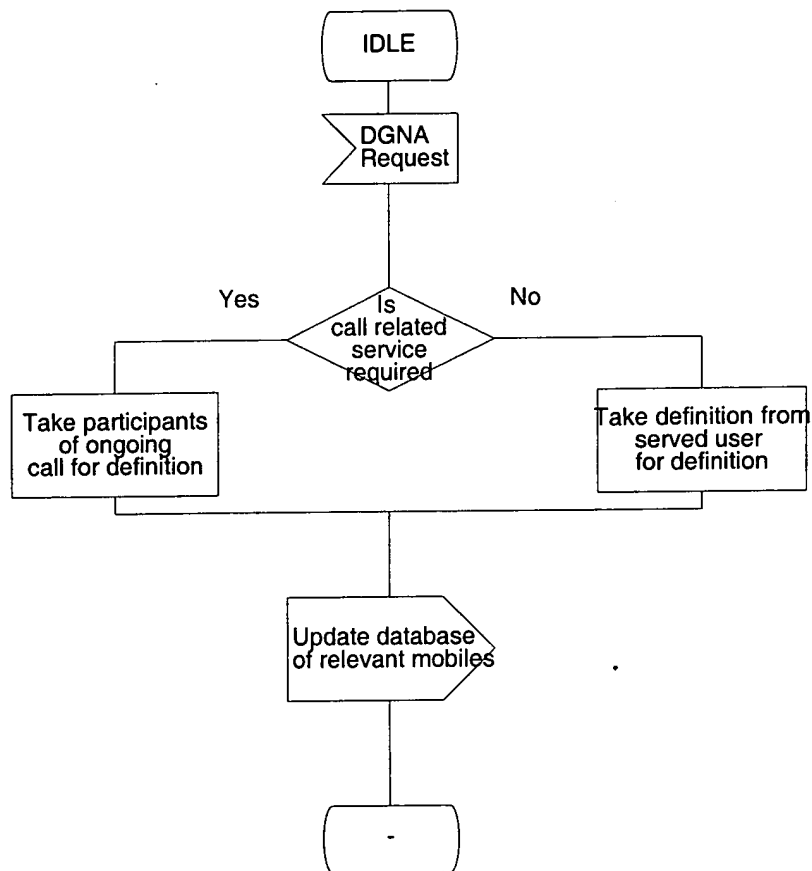


Figure H.1: SS-DGNA supplementary service, overall SDL

## **Annex J (informative):      Supplementary Service stage 1: Transfer of Control (SS-TC) (TETRA 03.75)**

### **J.1      Scope**

This draft Interim European Telecommunication Standard (I-ETS) defines the stage 1 specifications of the Supplementary Service Transfer of Control (SS-TC) for the Trans-European Trunked Radio (TETRA). Stage 1 is an overall service description from the users point of view but does not deal with the details of the human interface itself.

This I-ETS specifies the service description of the supplementary service and the procedures to be expected with successful and unsuccessful outcomes. In addition this I-ETS specifies the interactions with other TETRA supplementary services and interworking considerations.

Charging principles shall be outside the scope of this I-ETS.

The SS-TC enables the served user during the ongoing multipoint call to transfer the ownership of the multipoint call to another TETRA user within the ongoing multipoint call. This service is not applicable to broadcast calls.

### **J.2      Normative references**

This I-ETS incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this I-ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1]                              ITU-T Recommendation Z.100 (1993): "Specification and Description Language (SDL)".

### **J.3      Definitions and abbreviations (TETRA 01.04)**

#### **J.3.1      Definitions**

For the purposes of this I-ETS the following definitions apply:

**Base Station (BS):** a physical grouping of equipment which provides the fixed portion of the air interface. One BS transmits and receives radio signals to and from a single location area (a single region of geographical coverage). A BS contains at least one Base Radio Stack (BRS).

**Bearer service:** a type of telecommunication service that provides the capability for the transmission of signals between user-network interfaces.

**Call owner:** the user who is able to actively clear the call.

**Mobile Station (MS):** a physical grouping that contains all of the mobile equipment that is used to obtain TETRA services. By definition, a MS contains at least one Mobile Radio Stack (MRS).

**Served user:** the call owner.

**Supplementary service:** a supplementary service modifies or supplements a bearer service or a teleservice. A supplementary service cannot be offered to a customer as a stand alone service. It should be offered in combination with a bearer service or a teleservice.

**Teleservice:** a type of telecommunications service that provides the complete capability, including terminal equipment functions, for communication between users according to agreed protocols.

### J.3.2 Abbreviations

#### J.3.2.1 General abbreviations

For the purposes of this I-ETS the following general abbreviations apply:

BS	Base Station
GTSI	Group TETRA Subscriber Identity
ISDN	Integrated Services Digital Network
ISI	Inter System Interface
ITSI	Individual TETRA Subscriber Identity
LS	Line Station
MS	Mobile Station
PSTN	Public Switched Telephone Network
PTN	Private Telephone Network
SDL	(Functional) Specification and Description Language
SS	Supplementary Service

NOTE: The abbreviation SS is only used when referring to a specific supplementary service.

SwMI	Switching and Management Infrastructure
TETRA	Trans-European Trunked Radio

#### J.3.2.2 Supplementary service abbreviations

For the purposes of this I-ETS the following supplementary service abbreviations apply:

SS-AL	Ambience Listening
SS-AoC	Advice of Charge
SS-AP	Access Priority
SS-AS	Area Selection
SS-BIC	Barring of Incoming Calls
SS-BOC	Barring of Outgoing Calls
SS-CAD	Call Authorized by Dispatcher
SS-CCBS	Call Completion to Busy Subscriber
SS-CCNR	Call Completion on No Reply
SS-CFB	Call Forwarding on Busy
SS-CFNRy	Call Forwarding on No Reply
SS-CFNRc	Call Forwarding on Mobile Subscriber Not Reachable
SS-CFU	Call Forwarding Unconditional
SS-CLIP	Calling Line Identification Presentation
SS-CLIR	Calling/Connected Line Identification Restriction
SS-COLP	Connected Line Identification Presentation
SS-CR	Call Report
SS-CRT	Call Retention
SS-CW	Call Waiting
SS-DGNA	Dynamic Group Number Assignment
SS-DL	Discreet Listening
SS-HOLD	Call Hold
SS-IC	Include Call
SS-LE	Late Entry
SS-LSC	List Search Call
SS-PC	Priority Call
SS-PPC	Pre-emptive Priority Call
SS-SNA	Short Number Addressing
SS-TC	Transfer of Control
SS-TPI	Talking Party Identification

## **J.4 Supplementary Service Transfer of Control (SS-TC) Stage 1 specification**

### **J.4.1 Description**

#### **J.4.1.1 General description**

SS-TC shall be defined as the facility whereby the owner of a multipoint call shall be able to subsequently transfer the ownership of the call to another TETRA user within the multipoint call. The previous owner shall be able to release from the multipoint call, but the call shall continue in his absence.

#### **J.4.1.2 Qualifications on applicability to telecommunication services**

SS-TC shall be applicable to TETRA group calls and to acknowledged group calls.

### **J.4.2 Procedures**

#### **J.4.2.1 Provision and withdrawal**

This service shall be provided by prior arrangement or shall be provided on a general basis.

#### **J.4.2.2 Normal procedures**

##### **J.4.2.2.1 Activation, deactivation, registration and interrogation**

###### **J.4.2.2.1.1 Activation**

This supplementary service shall be activated upon provision.

###### **J.4.2.2.1.2 Deactivation**

This supplementary service shall be deactivated upon withdrawal.

###### **J.4.2.2.1.3 Registration**

As an operator option the service provider may provide the service only to registered users. In this case the following shall be provided to the service provider:

- 1) registered user identification (ITSI);
- 2) applicable basic services, e.g. clear speech group call.

NOTE: If no basic service is inserted by the user, this is interpreted by the service provider as all TETRA multipoint calls.

###### **J.4.2.2.1.4 Interrogation**

The TETRA network shall support interrogation on a per number basis for all basic services and/or for a user specified basic service. The TETRA response to an interrogation request may provide the following information to the user:

- ability to invoke the supplementary service;
- applicable basic services.

##### **J.4.2.2.2 Invocation and operation**

This service shall be invoked by the served user. The served user shall provide information about the identification of the proposed call owner.

It is necessary that the proposed call owner shall be involved within the ongoing multipoint call. Upon acceptance of the invocation, the infrastructure shall return a notification to the served user that the

invocation was successful. In addition the new call owner shall receive a notification and shall acknowledge acceptance that the call ownership has been transferred to him.

The originator may choose to remain active in the call or he may choose to leave the call.

Should the originator choose to leave the call, the call shall remain operative and shall not be cleared until the new call owner clears the call.

It shall be an operator option as to the charging arrangements for the remainder of the call, once the call ownership has been transferred.

#### **J.4.2.3 Exceptional procedures**

##### **J.4.2.3.1 Activation, deactivation, registration, and interrogation**

###### **J.4.2.3.1.1 Activation**

Not applicable.

###### **J.4.2.3.1.2 Deactivation**

Not applicable.

###### **J.4.2.3.1.3 Registration**

If the system cannot accept a registration request, the service provider shall receive a notification that SS-TC registration was not successful. Possible causes can be:

- 1) registered user identification (ITSI) is not allowed;
- 2) applicable basic services, e.g. clear speech group call is not allowed.

###### **J.4.2.3.1.4 Interrogation**

If the TETRA network cannot accept an interrogation request, the interrogating user shall receive a notification that SS-TC interrogation was unsuccessful. Possible causes for rejection can be:

- service or option not subscribed to;
- insufficient information;
- basic service to which relevance is requested is not subscribed to.

##### **J.4.2.3.2 Invocation and operation**

If the infrastructure cannot invoke the service, the cause shall be returned to the subscriber. Possible causes can be:

- 1) invoking user is not authorized;
- 2) the proposed call owner (ITSI) is not a part of the ongoing multipoint call;
- 3) the applicable basic service, e.g. clear speech group call has not been authorized.

#### **J.4.3 Interactions with other supplementary services**

##### **J.4.3.1 Calling Line Identification Presentation (SS-CLIP)**

SS-TC shall not have any interaction with SS-CLIP.

**J.4.3.2 Connected Line Identification Presentation (SS-COLP)**

SS-TC shall not have any interaction with SS-COLP.

**J.4.3.3 Calling/Connected Line Identification Restriction (SS-CLIR)**

SS-TC shall not have any interaction with SS-CLIR.

**J.4.3.4 Call Report (SS-CR)**

SS-TC shall not have any interaction with SS-CR.

**J.4.3.5 Talking Party Identification (SS-TPI)**

SS-TC shall not have any interaction with SS-TPI.

**J.4.3.6 Call Forwarding Unconditional (SS-CFU)**

SS-TC shall not have any interaction with SS-CFU.

**J.4.3.7 Call Forwarding on mobile subscriber Busy (SS-CFB)**

SS-TC shall not have any interaction with SS-CFB.

**J.4.3.8 Call Forwarding on No Reply (SS-CFNRy)**

SS-TC shall not have any interaction with SS-CFNRy.

**J.4.3.9 Call Forwarding on mobile subscriber Not Reachable (SS-CFNRc)**

SS-TC shall not have any interaction with SS-CFNRc.

**J.4.3.10 List Search Call (SS-LSC)**

SS-TC shall not have any interaction with SS-LSC.

**J.4.3.11 Call Authorized by Dispatcher (SS-CAD)**

SS-TC shall not have any interaction with SS\_CAD.

**J.4.3.12 Short Number Addressing (SS-SNA)**

SS-TC shall not have any interaction with SS-SNA.

**J.4.3.13 Area Selection (SS-AS)**

SS-TC shall not have any interaction with SS-AS.

**J.4.3.14 Access Priority (SS-AP)**

SS-TC shall not have any interaction with SS-AP.

**J.4.3.15 Priority Call (SS-PC)**

SS-TC shall not have any interaction with SS-PC.

**J.4.3.16 Call Waiting (SS-CW)**

SS-TC shall not have any interaction with SS-CW.

**J.4.3.17 Call Hold (SS-HOLD)**

SS-TC shall not have any interaction with SS-HOLD.

**J.4.3.18 Call Completion to Busy Subscriber (SS-CCBS)**

SS-TC shall not have any interaction with SS-CCBS.

**J.4.3.19 Late Entry (SS-LE)**

SS-TC shall not have any interaction with SS-LE.

**J.4.3.20 Transfer of Control (SS-TC)**

SS-TC shall not have any interaction with SS-TC. The new call owner may in turn transfer the ownership of the call to another TETRA user active in the call.

**J.4.3.21 Pre-emptive Priority Call (SS-PPC)**

SS-TC shall not have any interaction with SS-PPC.

**J.4.3.22 Include Call (SS-IC)**

SS-TC shall not have any interaction with SS-IC.

**J.4.3.23 Advice of Charge (SS-AoC)**

SS-TC shall not have any interaction with SS-AoC.

**J.4.3.24 Barring of Outgoing Calls (SS-BOC)**

SS-TC shall not have any interaction with SS-BOC.

**J.4.3.25 Barring of Incoming Calls (SS-BIC)**

SS-TC shall not have any interaction with SS-BIC.

**J.4.3.26 Discreet Listening (SS-DL)**

SS-TC shall not have any interaction with SS-DL.

**J.4.3.27 Ambience Listening (SS-AL)**

SS-TC shall not have any interaction with SS-AL.

**J.4.3.28 Dynamic Group Number Assignment (SS-DGNA)**

SS-TC shall not have any interaction with SS-DGNA.

**J.4.3.29 Call Completion on No Reply (SS-CCNR)**

SS-TC shall not have any interaction with SS-CCNR.

**J.4.3.30 Call Retention (SS-CRT)**

SS-TC shall not have any interaction with SS-CRT.

**J.4.4 Interworking considerations**

SS-TC shall be available across the intersystem interface if the ongoing call stretches across a number of TETRA systems.



#### J.4.5 Overall SDL

Figure J.1 contains the dynamic description of SS-TC using the Specification and Description Language (SDL) defined in ITU-T Recommendation Z.100 [1]. The SDL process represents the behaviour of the network in providing SS-TC.

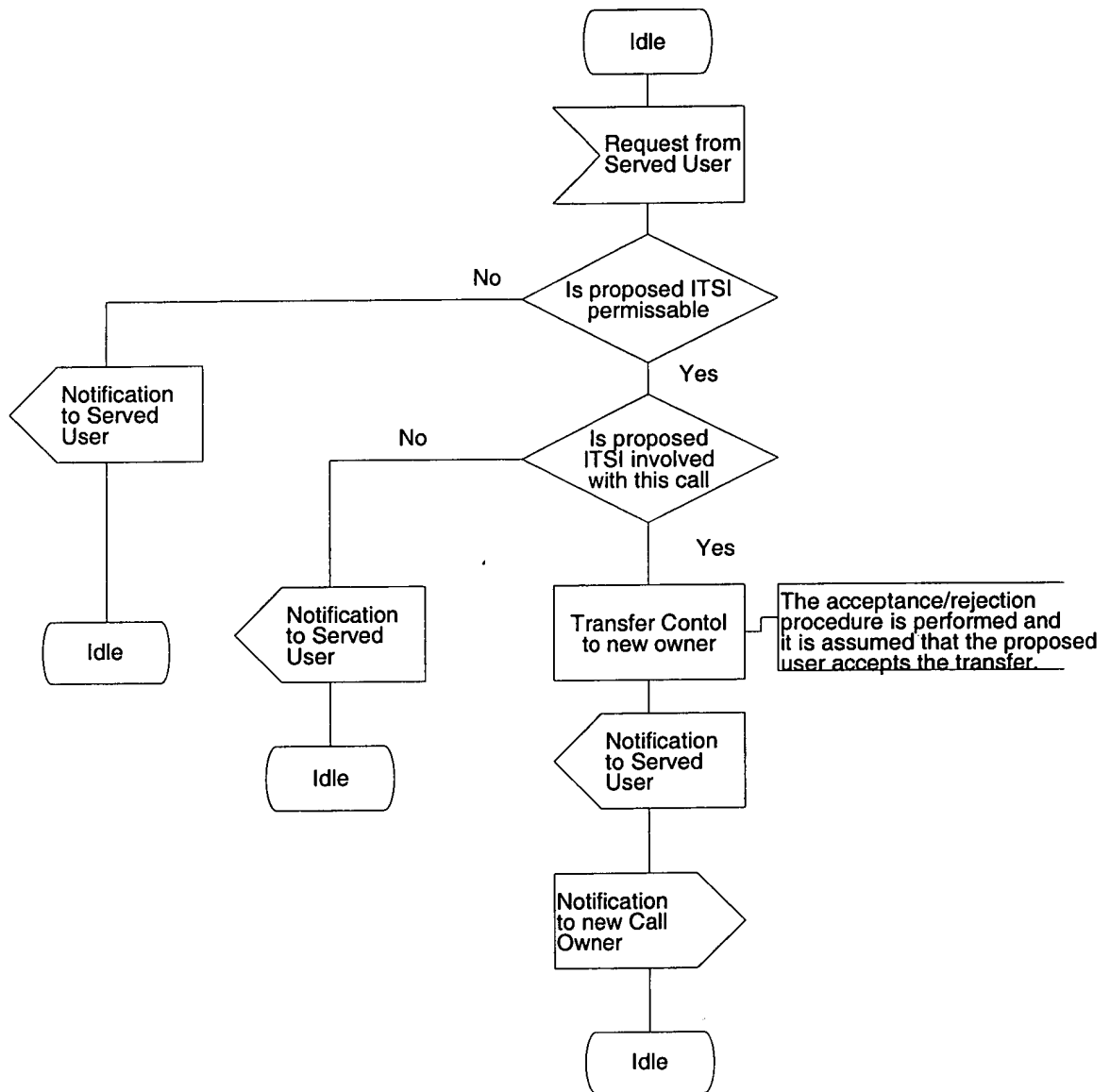


Figure J.1: SS-TC supplementary service, overall SDL

History

Document history	
November 1994	First Edition
October 1995	Converted into Adobe Acrobat Portable Document Format (PDF)